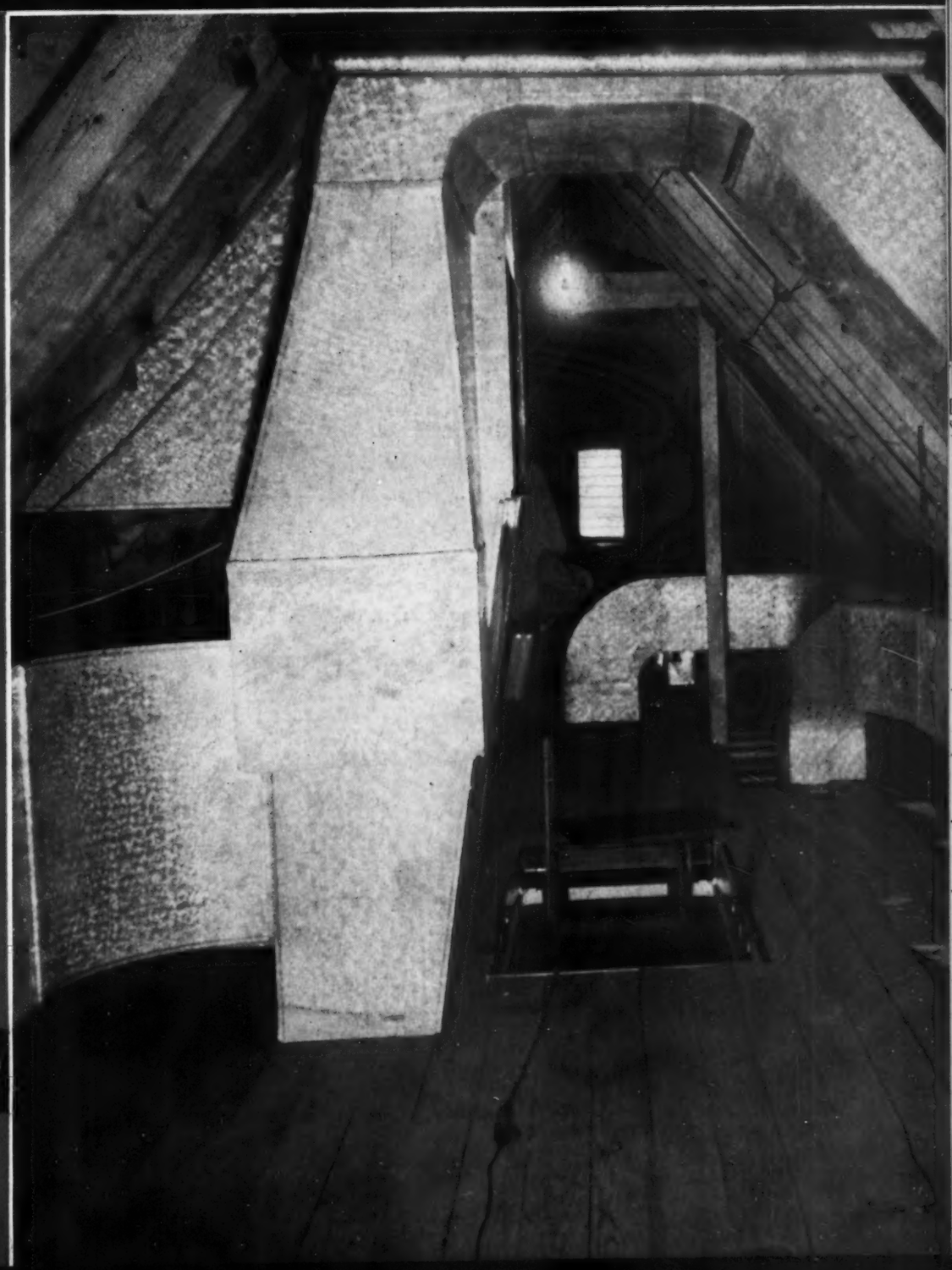
AMERICAN ARTISAN

WARM AIR HEATING • AIR CONDITIONING
SHEET METAL CONTRACTING



AIR CONDITIONING SECTION

PAGE 47

ESTABLISHED 8 8 0

MAY 1938

It's EASY-with LAMNECK

● In more ways than one the Lamneck system of Prefabricated Duct and Fittings makes things easy for the dealer, jobber and manufacturer—lessens work, worry and trouble—saves time and money.

Easy To Lay Out

The Lamneck System is easy to lay out because it is so extremely flexible and perfectly engineered to solve all possible installation problems. In addition it gives you a choice of three complete systems involving both rectangular and round branch take-offs which may be used in combinations to fit any space or meet any requirements.

Easy To Install

Not only are all Lamneck parts constructed to fit accurately, but an ingenious assembly method permits joining the units together by simply sliding them into place. The joints are then locked by simple means to make a rigid assembly. Only a few ordinary hand tools are required and practically anyone with little experience or training can install the job with ease.

Easy To Obtain

Besides a centrally located factory of large production capacity Lamneck has jobbers who maintain ample warehouse stocks of Lamneck products in forty-eight conveniently located cities within easy reach to insure prompt delivery anywhere in the United States.

Easy To Buy

Time after time dealers in all parts of the country have proved to their entire satisfaction that they can buy Lamneck Prefabricated Duct and Fittings cheaper than they can make their own. It is easy to buy Lamneck Prefabricated Duct, Fittings and Registers and at the same time you get a better styled, better engineered and more efficient product that insures a satisfied customer.

★ TOP QUALITY PREFABRICATED DUCT, GRAVITY FITTINGS AND REGISTERS

Wide availability of jobbers' stocks in all parts of the country insure prompt delivery. Write us for name of jobber in your locality.

LP INC.

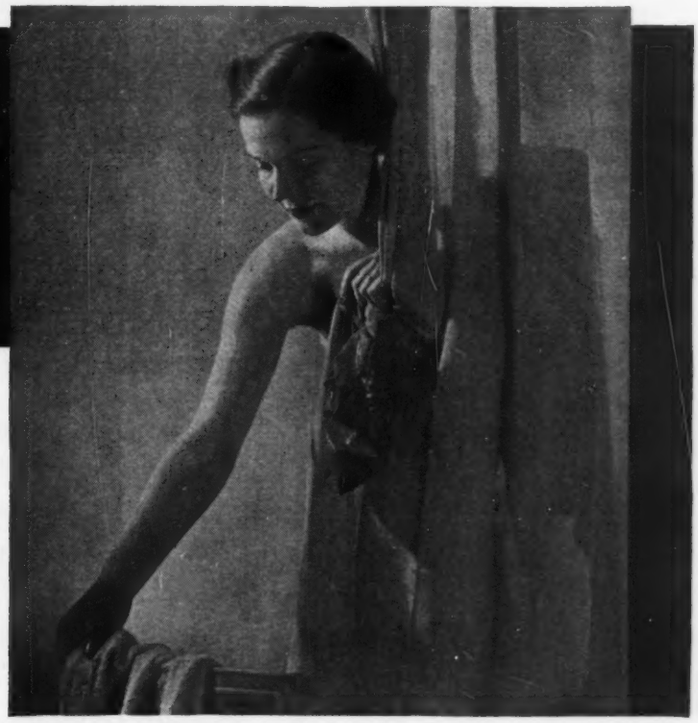
LAMNECK PRODUCTS, INC.

414 DUBLIN AVENUE • COLUMBUS, OHIO

PREFABRICATED DUCT AND FITTINGS FOR ALL TYPES OF WARM AIR HEATING AND AIR CONDITIONING SYSTEMS

A SPRING BUSINESS OPPORTUNITY FOR THE HEATING TRADE

PROMOTE SALES OF ANTHRACITE WATER HEATERS AND AUTOMATIC REGULATORS



You have an additional opportunity in homes already using Anthracite Water Heaters. Recommend automatic regulators to give temperature control without manual attention. Modern regulators can be bought at a cost any home owner can afford and their installation will add profitable new customers and gain prospects for your other anthracite equipment.

Water Heater regulators approved by Anthracite Industries' Laboratory are manufactured by:

- American Radiator Co., 40 W. 40th St., New York
- Fulton Sylphon Company, Knoxville, Tenn.
- E. J. Deegan Mfg. Co., 725 E. 135th St., New York
- James Regulator Company, Pottsville, Pa.
- National Regulator Co., 2317 Knox Ave., Chicago

EVERY YEAR hundreds of thousands of domestic water heaters are sold when heating plants are shut down for the summer.

This has always been true, but the opportunity to sell Anthracite Water Heaters has never been so great as it is today. That is because of the changes that have been made in the Anthracite equipment itself.

Modern Anthracite Water Heaters have automatic controls that keep water at the right temperature day and night. It is not necessary to regulate the heater by hand.

Today's Automatic Anthracite Water Heaters are more efficient than ever before. If you are not familiar with modern Anthracite Water Heaters, see for yourself how different they are.

Get more of this profitable business. Tell home owners how they can get all the hot water they can use, 24 hours a day, for a third of the cost of the same service with gas.

ANTHRACITE INDUSTRIES, INC.
Chrysler Building New York, N. Y.

This Seal of Approval appears on Anthracite equipment only after it has passed the most rigid tests in the heating field.

ANTHRACITE INDUSTRIES approved INCORPORATED

Pennsylvania
ANTHRACITE
WATER HEATERS

In This Issue

THE cover illustration of this issue shows an attic ventilating-night air cooling system installed in a Kansas City residence. An article on page 49 shows and explains the design and gives operating results. Contractor Arthur Hunt's remarks on leaky attics, air flow through first floor rooms and control of air volumes from various parts of the house are especially pertinent.

★

On page 32 we publish an article by B. F. John showing the actual overhead figures and items for 46 Philadelphia shops ranging in size from $8,000 to $75,000 per year gross volume. The many items included are interesting, but the most interesting point, to our way of thinking, is the large percentage of all overhead cost represented by "owner's salary." Contractors who draw a large salary may find here one answer to why it costs them so much to do business. Also, every salary-owner should be sure his services are really worth the unproductive overhead cost.

★

Drainage systems on residences have for many years been confined largely to copper and galvanized iron. On page 40 an article tells about gutters and downspouts made of Monel metal with the same material used for flashing, dormer roofing and ventilating louvres located in false chimneys.

★

Out in California, says an article on page 44, many sheet metal shops find an outlet for fabricating and repair work in the manufacture and maintenance of orchard heaters. These small, oil-burning stoves are used by orchardists to ward off killing frosts.

★

Since G. A. Voorhees' series on Precalculated Engineering began, several readers have asked how window sizes common to their locality can be recalculated. Mr. Voorhees furnishes a table in this issue (page 54) whereby windows of a size different from his standard 2½ by 5 feet can be converted to equivalent numbers of standard sized windows. The author also offers some pertinent figures covering **exact** calculations in comparison with **nearly exact** calculations.

★

William Neubecker's series of patterns for air conditioning fittings (page 60) has brought in a number of requests for particular patterns. Those requests considered valuable have been incorporated in special articles which will be inserted in the planned series. This month's pattern covers a reader's request for a reverse stack elbow with a curved heel.

★

A combination gas heated, fan cooled, small office building for which detailed costs were kept is reported on page 62. The interesting feature is the close comparison between calculated monthly cost with actual cost.

AMERICAN ARTISAN

With which is merged

FURNACES and SHEET METALS AND Warm-Air Heating

Covering All Activities in

Gravity Warm Air Heating — Forced Warm Air Heating
Sheet Metal Contracting — Ventilating
Air Conditioning

J. D. Wilder, Editor

A. A. Kennedy, Assistant Editor — Brewster S. Beach, Consulting Editor

Vol. 107, No. 5 — May, 1938 — Founded 1880

CONTENTS

The Small Shop Can Operate At Lower Cost 29
Alamo of San Antonio 30
Overhead Items from Philadelphia Shops 32
Resistance Welding (Part 5) 34
Ohio Convention Dips Into Costs of Business 37
Monel Drainage System on a Residence 40
Arnold Kruckman's Washington Letter 42
Orchard Heaters 44
Pattern for a Twelve-Pointed Star 46
Licensing and Permit Code of Toledo, Ohio 67
New Products 68
Association Activities 73
With the Manufacturers 75
News Items 80
New Literature 88

THE AIR CONDITIONING SECTION

Combination Night Air Cooling—Warm Air Heating .. 49
Basement Recreation Rooms 52
G. A. Voorhees' Precalculated Engineering 54
Attic Ventilation in the Southwest (San Antonio) 58
Pattern for Reverse Center Elbow, Curved Heel 60
Gas Heated-Fan Cooled California Office Building 62

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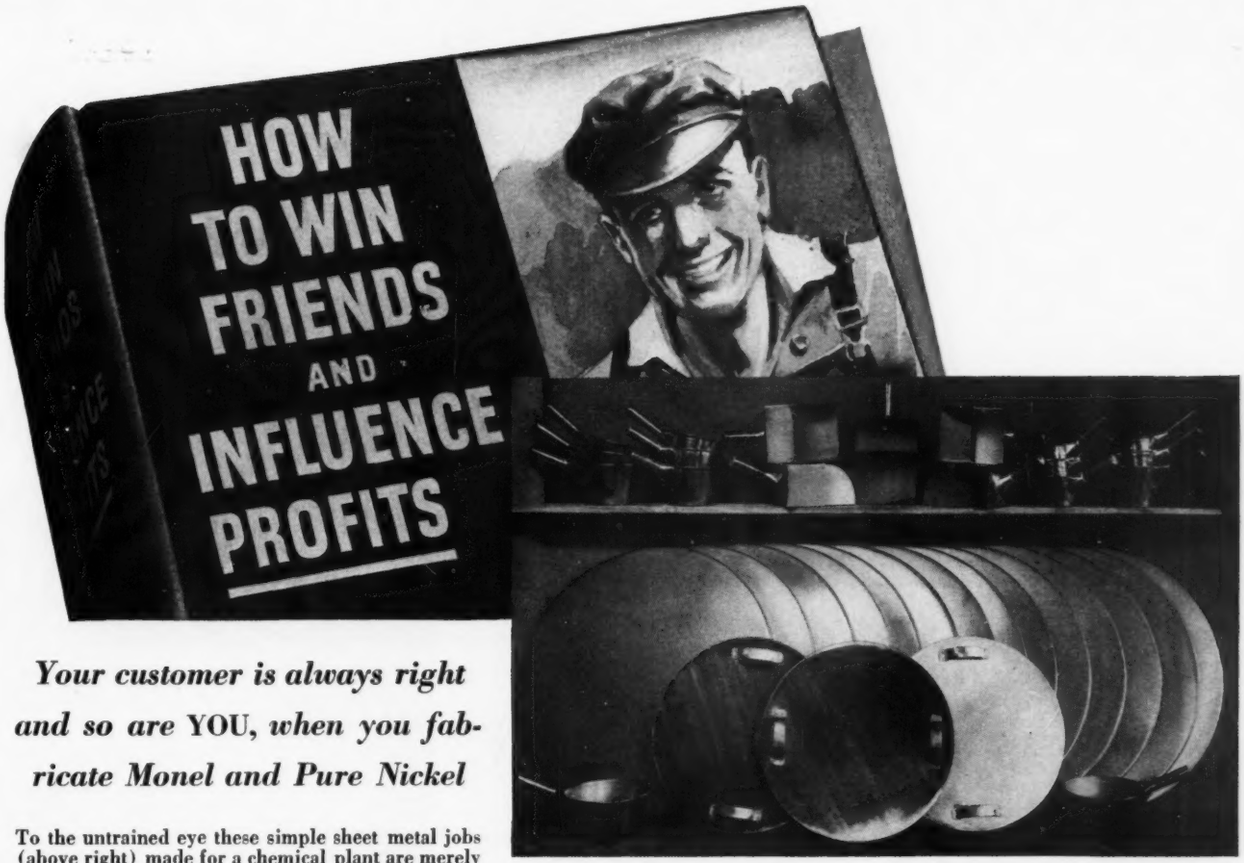
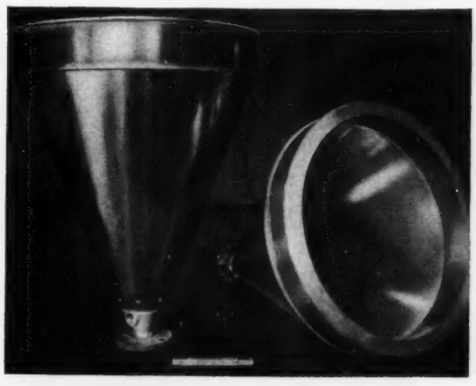
More than 8,000 Copies of this Issue are being distributed



Your customer is always right and so are YOU, *when you fabricate Monel and Pure Nickel*

To the untrained eye these simple sheet metal jobs (above right) made for a chemical plant are merely trays and utensils. But they are made of Monel.* To the smart sheet metal worker that means extra satisfaction for the user...and extra profits for him. The ready workability of Monel makes it ideal for utensils, covers and trays that must be corrosion-proof. (Photo courtesy of Kalamazoo Sheet Metal Works, Kalamazoo, Michigan.)



Lock seams and solder were used to construct these all-Monel jacketed hoppers which protect the purity and uniformity of pharmaceuticals. Circulation of water in the jacket maintains proper consistency of the product. Because of its strength, combined with freedom from rust and resistance to the corrosive attack of both pharmaceutical products and hot water, Monel is well suited to this type of service. Monel is also readily fabricated to form such equipment. (Fabricated by G. D. L. Raymond Company, Stamford, Connecticut.)

• • •

Write for further information and complete working instructions. Ask also for the booklet "400 Applications for Monel, Nickel and Inconel." Address:

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York, N. Y.

The interesting percolator (at left) is fitted with perforated Nickel trays to hold ginger root while extraction is accomplished by circulating alcohol and water. Pure Nickel is selected because it is tough, strong, durable, and prevents contamination of edible products, so assures trouble-free service and long life. Incidentally, Pure Nickel is easy to fabricate, so is profitable for the sheet metal worker to fabricate. (Constructed by O. Mayer, Inc., New York City, N. Y.)

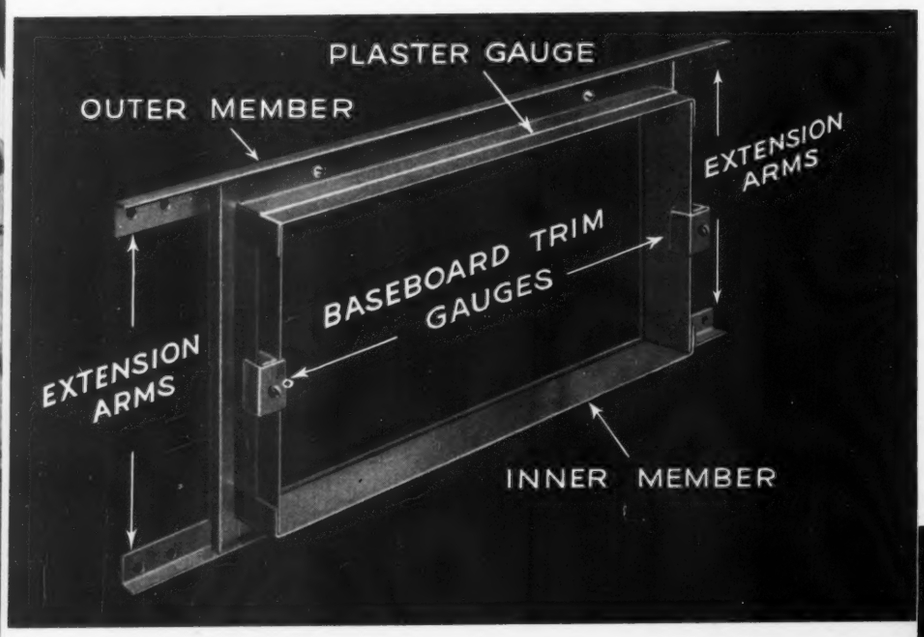
• • •

(Below) Monel rectangular shallow trays suitable for drying, cooling, handling and general processing of foodstuffs, edible dyestuffs, and many crystalline chemicals. Simple to make, jobs like these are so much "gravy" for any sheet metal contractor. (Photo courtesy of Beckley Perforating Company, Garwood, N. J.)

MONEL INCO MONEL

*"Monel" is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds Nickel and one-third copper.

For BETTER, Less Expensive Installations



..Use the New

H&C

BASEBOARD STUD FRAME No. 8

TWO WAYS TO INSTALL STACKHEAD

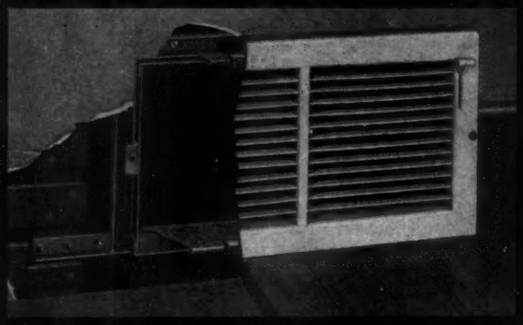
METHOD No. 1

Installation with stackhead formed over inner member.

METHOD No. 2

Installation with stackhead clamped between inner and outer members of frame.

COMPLETED INSTALLATION



A solid, secure, permanently tight, streakproof installation that actually costs less than one made without using a frame.

Featuring these Advantages:

1. **EASY to INSTALL**—Choice of two methods as shown at right.
2. **ELIMINATES STREAKING** — Sponge Rubber Gasket furnished attached to Register forms airtight connection with Frame.
3. **NO BLOCKING-IN REQUIRED**—Extension arms fasten directly to studs.
4. **LOCATES STACKHEAD ACCURATELY**—Frame is positioned from sub-flooring using piece of finished flooring as gauge.
5. **PREVENTS DAMAGE TO STACKHEAD**—Frame protects stackhead during all stages of building operations.
6. **FORMS SOLID FOUNDATION FOR REGISTER**—Frame becomes integral part of building.
7. **PLASTER AND BASEBOARD TRIM GAUGES**—Furnish guide for plasterer and carpenter.

Note: All designs of H & C 1-Piece Baseboard Registers produced after this date may be used with No. 8 Frame, but temporarily, in ordering registers for this purpose, it is necessary to specify that the registers are to fit No. 8 Frame.

List prices and discounts of No. 8 Frame are the same as H & C No. 3 Sidewall Frame shown in Table 27, Catalog No. 37AC, Page 30; Catalog No. 37, Page 84; and Pocket Guide, Page 36.

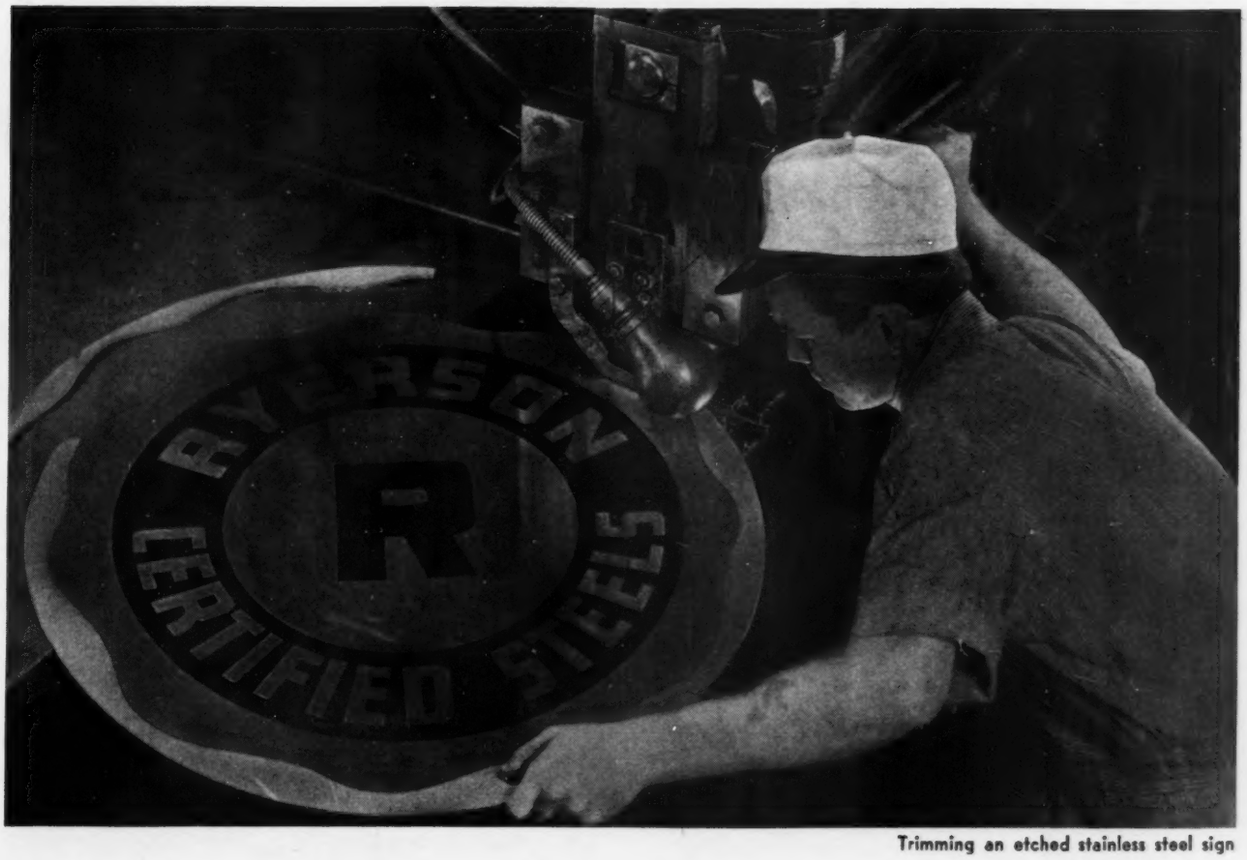
For detailed description and List Prices send for Bulletin S2 just off the press.

HART & COOLEY MANUFACTURING CO.

Warm Air Registers — Air Conditioning Grilles
Damper Regulator Sets — H&C — Dampers, Chain, Pulleys

61 W. KINZIE STREET, CHICAGO, ILLINOIS

ENGINEERING OFFICE AND FACTORY · HOLLAND · MICH·



Trimming an etched stainless steel sign

Easy Workability Assured

RYERSON Certified Steel Sheets represent the highest quality obtainable. All the different kinds are carefully tested to see that they have the qualities most desired for their particular purpose. They are carefully checked for finish, flatness, gauge and size accuracy.

Prime quality, workable sheets are assured. Ryerson Certified Steels also include Bands, Channels, Angles and all other steel products for the sheet metal worker. You can save time and money by concentrating your purchases. Let one order to Ryerson cover all of your steel requirements.

Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City

RYERSON *Certified* STEELS

RYERSON SHEETS INCLUDE:

Allegheny Stainless	Galvanized	Stretcher Levelled
Blue Annealed	Panel and Sign	Uniform Blue
Copper Alloy	Galvannealed	Vitreous Enameling
Corrugated	Heavy Hot Rolled	Wellsville Polished
Deep Drawing	Long Terne	and Many Others

HERE'S A MAN WHO KNOWS THERE'S GOOD MONEY IN THE FURNACE BUSINESS

HE'S MAKING IT — *NOW!*

Read why Mr. Richardson made a change!

Mr. J. H. Richardson, of Terre Haute, Ind., is an experienced and successful furnace man who knows all the "ins" and "outs" of the business. He had sold hundreds of furnaces for one of the larger manufacturers. Recently Mr. Richardson changed over to the Williamson "Tripl-ife." Here's what he says: "I think the 'Tripl-ife' is the most salable furnace on the market today and, naturally, the biggest money-maker for the dealer." Mr. Richardson's experience is like that of many other far-seeing Dealers who are changing to the furnace that offers them something more to sell than just so many pounds of iron and steel. Mr. Richardson today is owner of The Richardson-Williamson Company, Terre Haute, Ind., and has a prosperous, growing business.

Mr. Richardson Sells—

Modern heating that provides uniform comfort in every room.

Automatic built-in Heat Control . .

Automatic water-pan filler . .

Twenty-year Guaranty against burnout of castings . .

Everything that contributes to convenient, dependable heating.

MR. RICHARDSON IS MAKING MONEY

OPPORTUNITY FOR YOU!

If you're in the furnace business, it might pay you, as it paid Mr. Richardson, to investigate the Williamson "Tripl-ife." No matter how good a set-up you may have, "Tripl-ife" may prove a better one. For with "Tripl-ife" you sell the latest scientific development in heating—automatic convenience—guaranteed freedom from costly repairs for 20 years. With such a proposition, sales are easier and troubles are lifted from your shoulders. If you are not in the furnace business, but looking for a good line that offers profits and permanence, investigate the "Tripl-ife" opportunity. Write today for full details.

THE WILLIAMSON HEATER COMPANY

"Over 50 Years of Service"

CINCINNATI, OHIO

Jobbers and Complete Warehouse Stocks in Principal Cities

WILLIAMSON TRIPL-IFE FURNACES

IS YOUR "Get Busy" SIGNAL!

● New houses under construction...remodeling jobs. *Both* are wide-open business opportunities for you. Complete, new warm-air installations for new houses; and furnace repair and cleaning jobs on remodeling projects. Go after this business even if construction is well under way. *It is never too late to sell anybody better heating and maintenance service.* If you handle a unit equipped with Owens-Illinois DUST-STOP Replacement-Type Air Filters, much is in your favor, because the general public *knows* about DUST-STOP high efficiency and low cost. For complete information about making big, year-after-year profits on original and replacement sales of DUST-STOP Air Filters, send the coupon.

Owens-Illinois Glass Company, "FIRST IN GLASS", Toledo, Ohio.

● DUST-STOP Replacement-Type Air Filters manufactured exclusively by Owens-Illinois Glass Company... world's largest manufacturer of glass containers. . . Also producers of INSULUX Glass Block, FIBERGLAS Insulating Wool, Insulating Blankets and Filter Cloth.

OWENS-ILLINOIS

DUSTOP

REPLACEMENT-TYPE

AIR FILTERS

OWENS-ILLINOIS GLASS COMPANY
Industrial and Structural Products Division
301 Madison Avenue, Toledo, Ohio

Please send, without obligation, all the facts about DUST-STOP Replacement-Type Air Filters.

Name _____

Address _____

City _____ *County* _____

State _____

Put Yourself in your prospect's shoes . . .

Given the choice between the recognized value of any well-known product and an unknown make, which would you select? Naturally, you'd pick the one you knew something about. Now, isn't it reasonable to suppose that this same buying habit applies to your prospects for sheet metal, roofing and heating installations?

Some of the names on this page represent materials or products which your customers know well and would like to have used on their work. Others stand for the better tools and machinery which you could use profitably in yours. These are but a few of the many items handled by OSBORN in a sincere effort to give you one dependable source of supply for everything you may need to maintain a profitable and pleasant association with your customers. These products are described in the OSBORN Stock List. May we send you a copy?

ANACONDA Copper
ARMCO Ingot Iron and Stainless Steels
AUER Registers
BARRETT Roofing and Siding
BLACK & DECKER Tools
CRESCENT Tools
CRISE Furnace Controls
F. DIECKMANN Elbows
DREIS & KRUMP Brakes
DUSTOP Filters
FALCO Aluminum
GOLDEN STAR Sheets
INDEPENDENT Registers
INSELBRIC Siding
KEASBEY & MATTISON Roofing and Siding
MARSHALLTOWN Shears
MINNEAPOLIS-HONEYWELL Controls
MINSTER Presses
NIAGARA Tools and Machinery
PARKER-KALON Products
PEXTO Tools
STANLEY Unishears
SUPERIOR Galvannealed Sheets
WHITNEY Tools and Machinery
WISS Snips

THE J. M. & L. A.
OSBORN Co
Manufacturers—Distributors
BUFFALO · CLEVELAND · DETROIT

A DEPENDABLE SOURCE OF SUPPLY FOR 79 YEARS

MAJESTIC HAS IT!

A Complete Line
FOR BETTER HEATING

Leaders in Quality for Over 35 Years

A centralized source of supply plus high quality equipment to meet practically every heating requirement means more profits to you. And that's what Majestic offers you! By operating under the "Majestic banner" you are in a position to meet any individual preference as well as furnish proper equipment for anything from the small home to the church or commercial building. Because the Majestic Line is complete! It offers a full range of types, sizes and prices . . . gravity, forced air or air conditioning heating systems — Heavy Duty Cast or steel — coal, (hand or stoker fired), oil or gas. Also a complete line of pipe and fittings, accessories and automatic controls. Let Majestic show you the profit and business building possibilities of their complete line.

A real opportunity. Don't chance passing up a good proposition when it costs nothing to investigate.

Write Today for Details on Our Dealer Franchise

The MAJESTIC COMPANY

HUNTINGTON INDIANA

YOUR DEPENDABLE SOURCE
For Your Complete Register Needs

A full range of styles and sizes . . . assured quality in every price bracket . . . job-proven easy-installation features . . . all gravity and air conditioning designs backed by the many years experience of U. S. Engineers . . . these are reasons why you'll be ahead by making U. S. your headquarters for all register requirements.

Of course you are familiar with the famous National and Panama designs. Keep them in mind for all gravity installations for a thoroughly satisfactory job at low cost.

The comparatively new steel floor registers — TRUSSTEEL and EMBOSSED designs—are winning universal acclaim for their Super Strength and Capacity Construction, "snugger-fit," beautiful natural grain, lacquered Bronze, Plated, and Japanned finishes.

AND NOW, for the first time, we can offer you Air Conditioning Registers at exceptionally low prices—prices made possible by special high speed production-methods used on the new U. S. Louver-Stamped Directional-Flow Designs — also Competitively Listed Non-Directional-Flow Designs.

"ACES" for Gravity Jobs

NATIONAL

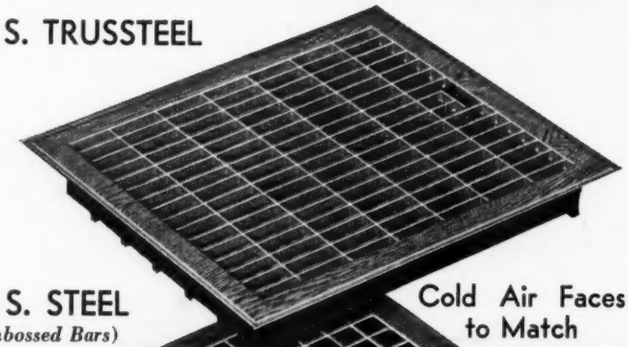
When a neat Diamond Lattice Design of Baseboard Register is needed no Greater value can be found than the Time-Tested National Register.

PANAMA

The beauty of this Modern Design with its Easy Installation Features has made the Panama Register the most popular of all Bar-Type Design Gravity Baseboard Registers.

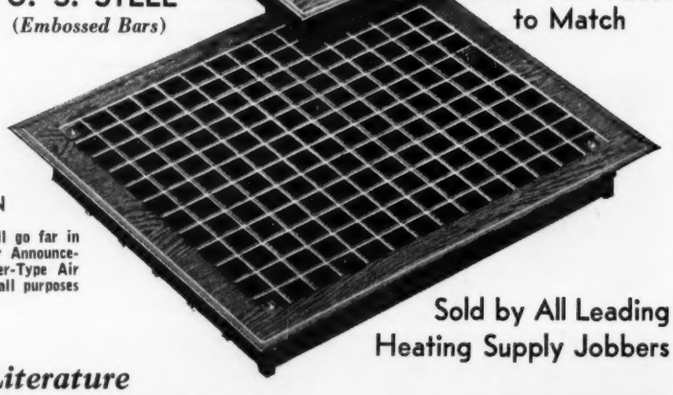
The Best in Floor Registers

U. S. TRUSSTEEL



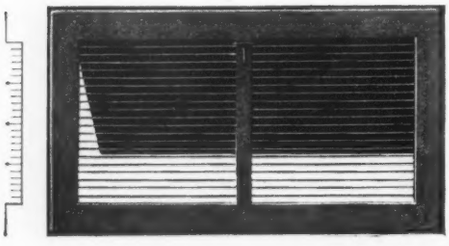
U. S. STEEL
(Embossed Bars)

Cold Air Faces to Match



Sold by All Leading Heating Supply Jobbers

COMING NEXT!
A Revolutionary Development!



STYLE 153 — HORIZONTAL LOUVER-STAMPED DESIGN

This is one of the many new air conditioning designs whose low price will go far in helping you sell more air conditioning jobs this season. Look for our Later Announcements of a New Patented Feature to be attached to the Style 153 Louver-Type Air Conditioning Register that will make it the MOST FLEXIBLY Adaptable to all purposes of Any Air Conditioning Register made.

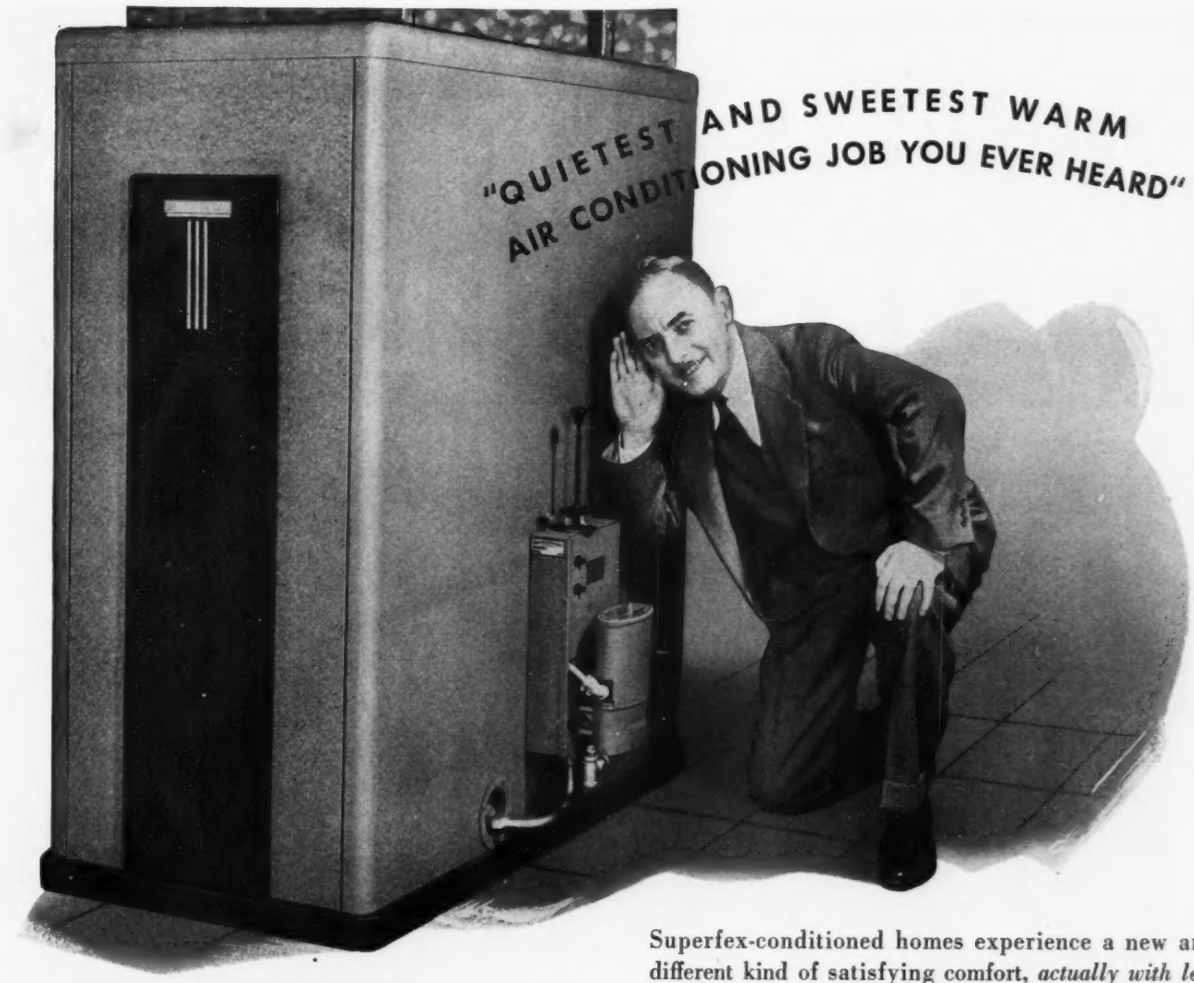
Send for Descriptive Literature

US

UNITED STATES REGISTER CO.

BATTLE CREEK, MICHIGAN

MINNEAPOLIS • KANSAS CITY • ALBANY • SAN FRANCISCO • NEW YORK, N. Y.



Gives continuous air flow on less fuel than "off and on" plants . . . a model for small homes, too

● Listen beside a Superfex Warm Air Conditioner in full operation. "Sweet and low" are the words for what you'll hear. And you must listen closely to hear any sound at all. For Superfex engineers have developed oil combustion and blower operation to a new high degree of quietness.

By "high-low" control instead of the old "off and on" system, Superfex produces continuous air conditioning for 24 hours a day—not just the average 8. Those layers of uncomfortably cold air which would normally settle in the LEG ZONE are picked up and mixed with warmer air by the gentle continuous currents from a Superfex. Occupants of Superfex-conditioned homes experience a new and different kind of satisfying comfort, *actually with less fuel than intermittent systems need.*

You will find the small homes market, being created by FHA insured building and modernization loans, *wide open to you.* Included in the Superfex line is Model 100 E at a price well within the cost limitations of the small home, and with the unusual quietness which small home installations require. It's a complete warm air conditioner—*shipped assembled*— with 65,000 B.t.u. capacity at the registers and synchronized high-low control of burner and blower. *No other unit like it now available. Thousands in use. Send the coupon below for full information.*

Get this FREE booklet

Describes Superfex operation. Pictures all models. Gives specifications. Contains valuable heating tips every dealer should have. *Sent FREE on receipt of coupon.*

SUPERFEX

The Mark Of Quality

OIL BURNING
WARM AIR
CONDITIONER

PERFECTION STOVE COMPANY
7900-E Platt Avenue, Cleveland, Ohio

Send me your free booklet describing Superfex Warm Air Conditioners.

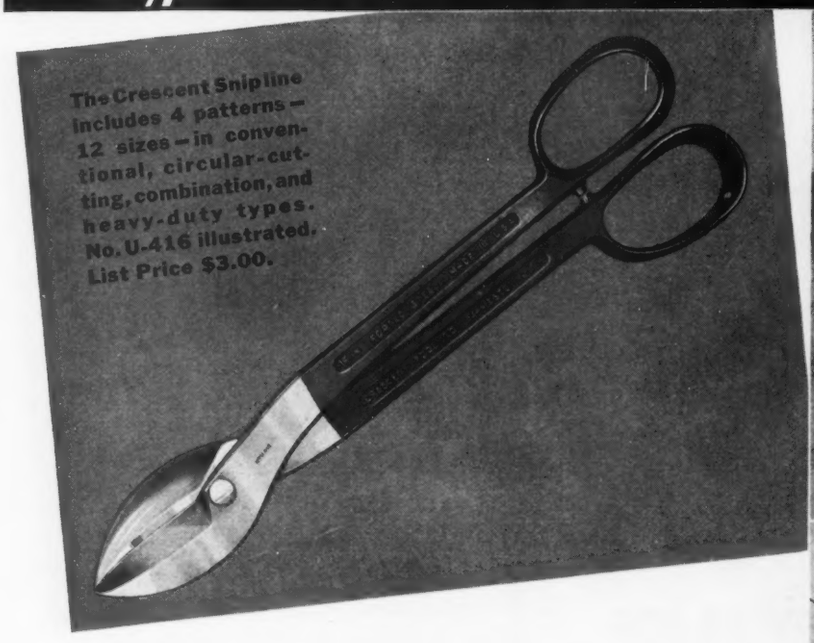
Name_____

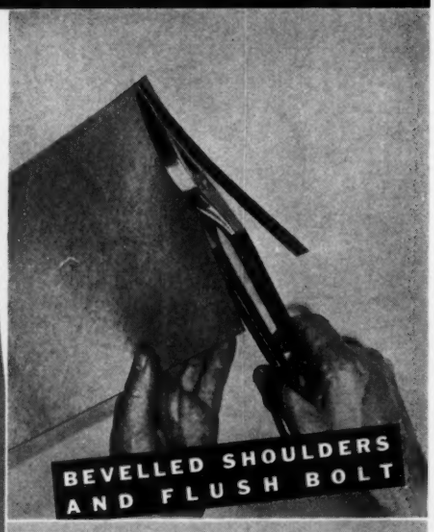
Street_____

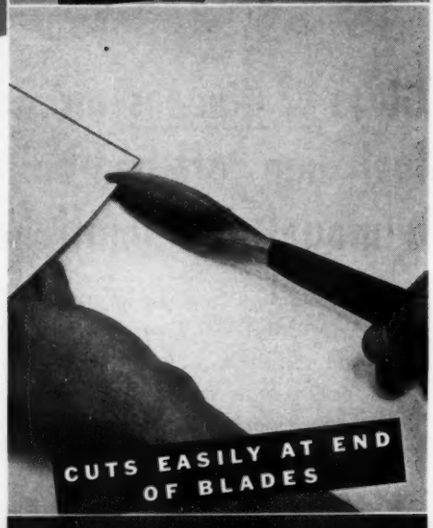
City_____ State_____

NUMBER THREE IN A SERIES OF THREE ADVERTISEMENTS EXPLAINING

Why CRESCENT SNIPS ARE SUPERIOR!


The Crescent Snipline includes 4 patterns—12 sizes—in conventional, circular-cutting, combination, and heavy-duty types. No. U-416 illustrated. List Price $3.00.





Crescent Snips are designed primarily to provide maximum *cutting ability*. But well as that quality has been provided, their design is such that other valuable features that make for greater utility and convenience, have been included rather than sacrificed.

For example, when a Crescent Snip cuts through stiff, awkward metal you will find it sliding smoothly over the gently-bevelled shoulders. The Bolt is flush too — always out of the way. And whether you are cutting well back on the blades or right out at the tips, your Crescent Snip cuts with remarkable ease. All in all, you'll find in Crescent Snips the little things, as well as the big ones, that make a mechanic a happier and better workman when he uses a really fine tool.

There is a Crescent pattern for every type of service. Be sure the next Snips you buy are Crescent. Sold by Hardware and Mill Supply dealers everywhere.

CRESCENT TOOL CO., JAMESTOWN, N. Y.

Operator using the G-E Mutator at the C. Frauneder Company, Oakland, Calif. In one year this arc welder saved $525

$525 SAVED IN ONE YEAR 20% Increase in Welding Speed with G-E Mutator Arc Welder

A 350 per cent return on his investment in a new General Electric light-gage Mutator arc welder is reported by Mr. C. Frauneder, manufacturer of ornamental metal work, Oakland, Calif.

"Not only has this machine saved us $525 in one year over the process formerly used," says Mr. Frauneder, "but it does the work about 20 per cent faster. We use the welder considerably in fabricating doors and panels for store fronts, and it is helping us obtain perfect welds at a much lower cost."

Enthusiastic testimonials like this are not exceptional. Since this low-current d-c machine was introduced, scores of users have told us the same thing. Its arc is "soft" and easy to strike; it provides good penetration; and it is a real money maker for those who fabricate or repair material requiring welding currents of 15 to 90 amperes.

Does your work involve the fabrication or repair of light-gage metal? If so, let the nearest G-E arc-welding distributor or G-E sales office demonstrate this set that has saved the Frauneder Company and others money. It may be just the right machine for your job. Or send the coupon to General Electric, Schenectady, N. Y.

General Electric
Dept. 6A-201, Schenectady, N. Y.

☐ Please send me Bulletin GEA-2447C, describing the G-E Mutator.

☐ Can I use the G-E Mutator successfully on my work? (Attach description of work.)

NAME .....

FIRM .....

STREET ..... STATE 140-82

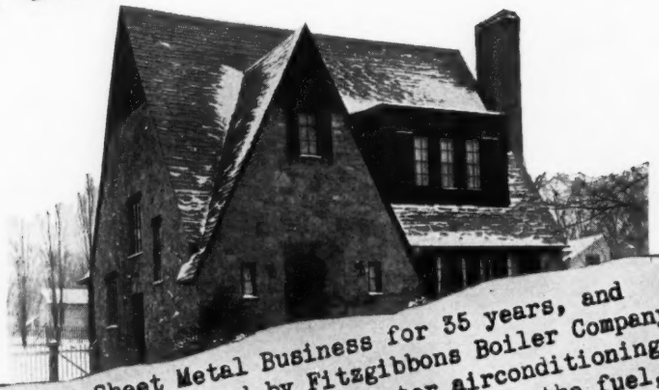
CITY .....

GENERAL ELECTRIC

Filing No. 8748

HEATING CONTRACTOR TAKES HIS OWN MEDICINE

In his own home . . .
installs stoker-fired
FITZGIBBONS DIRECTAIRE
conditioner

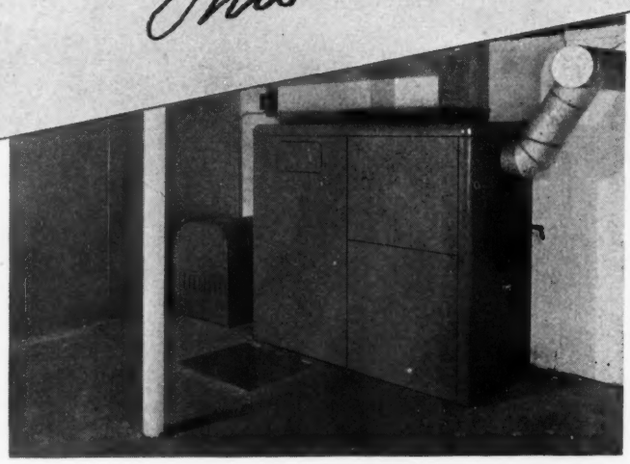


Results ➘

We have been in the Heating, Ventilating and Sheet Metal Business for 35 years, and we can truthfully say that this new unit as manufactured by Fitzgibbons Boiler Company for use in connection with stokers, is the last word as far as winter airconditioning is concerned. It works hand in hand with the stoker to get the most out of the fuel, which makes it a very economical heating system.

Very truly yours,
EMIL STEINHORST & SONS, Inc.
Thw. Steinhorst

TS:D
Enc.



Above, the attractive home of Emil Steinhorst, Jr. of Emil Steinhorst & Sons, Inc., heating contractors, Utica, N. Y. At right the equally attractive installation of FITZGIBBONS DIRECTAIRE, with anthracite stoker shown just behind it, and in background the steel wall of the dust-proof coal bin. Note the ash-pit cover in the floor beside the unit. Here ash is stored, and removed only at long intervals.

THE yearly cost of fuel and electric power for Winter air conditioning this home, is $84.30. Check that against any comparable figure!

Of course, it's an ideal installation — why shouldn't it be? The owner of the house being himself a heating and air conditioning engineer, naturally followed his best judgment all 'round. Hence the FITZGIBBONS DIRECTAIRE, noted for its enthusiastic cooperation with any kind of burner or fuel, its balanced delivery of properly humidified, filtered, warmed and circulated air at remarkable operating savings, its quiet performance, its good-looking, businesslike appearance.

Every architect and heating contractor will be vitally interested in DIRECTAIRE details. Write for them — and for information about the Fitzgibbons Dealer Franchise.

ANTHRACITE INDUSTRIES INCORPORATED approved

Fitzgibbons Boiler Company, Inc.

General Offices:
ARCHITECTS BUILDING, 101 PARK AVE., NEW YORK, N. Y.
Works: Oswego, N. Y. *Branches and Representatives in Principal Cities*
Distributed in Canada by
FESS OIL BURNERS OF CANADA, LTD., Toronto, Ontario; Montreal, Quebec

STOKER MOTORS *with* "*All-Way*" BUILT-IN PROTECTION

GUARD *Against* COSTLY MOTOR REPAIRS

"ALL-WAY" PROTECTION *against...*

OVER CURRENT

OVER HEATING

Now you can be sure of less motor worry!

Use Century "ALL-WAY" protected motors on all the stokers you install . . . Then:

Customers won't jangle your telephone with complaints about costly motor repairs — service costs will be less — because:

Century Motors may be provided with a built-in thermal element *that automatically functions to open the circuit and thereby protect the motor* against high temperatures in the winding from prolonged high starting currents — or sustained overloads.

PROVE IT—ASK A CENTURY SALESMAN

It's easy to test the motor on your own job—and prove that it is protected against high starting currents and dangerous overloads. Write our general office or one of our conveniently located branch offices for full information.

•

CENTURY ELECTRIC COMPANY

1806 Pine Street • • • St. Louis, Mo.

Offices and Stock Points in Principal Cities

Century MOTORS

TRANE AIR^{n} and THE HEATING CONTRACTOR

More and More the Demand Grows for Complete Year Round Air Conditioning. Progress and competition force the issue. Heating Contractors consequently should be in line with the times, eager to increase their business by turning this trend to their advantage, ready to go after their share of the mounting demand for Complete and True Air Conditioning.

This demand touches every activity, domestic, commercial, industial, where human comfort or product is affected, or where business goes to a competitor unless . . . !

The Trane Company has for over 50 years adhered steadily to the policy of working with the Contractor, the Engineer, the Architect. We make the equipment, ready for the plans and specifications of the contractor's installation. Over 8,000 Contractors are building business and increasing customer satisfaction and profits with Trane Equipment.

This symbol AIR^{n} *is used exclusively by Trane to signify the Nth degree of excellence in Heating, Cooling and Air Conditioning Equipment.*

Things to Think Over—The established policy of the Trane Company is to work *with* the Architect, Contractor, or Engineer.

Trane has the necessary equipment for any heating or air conditioning job irrespective of size or the problem involved.

The efficiency and economy of Trane basic fin and coil construction for all heating, cooling, ventilating and air conditioning applications have been proved by thousands of installations the world over.

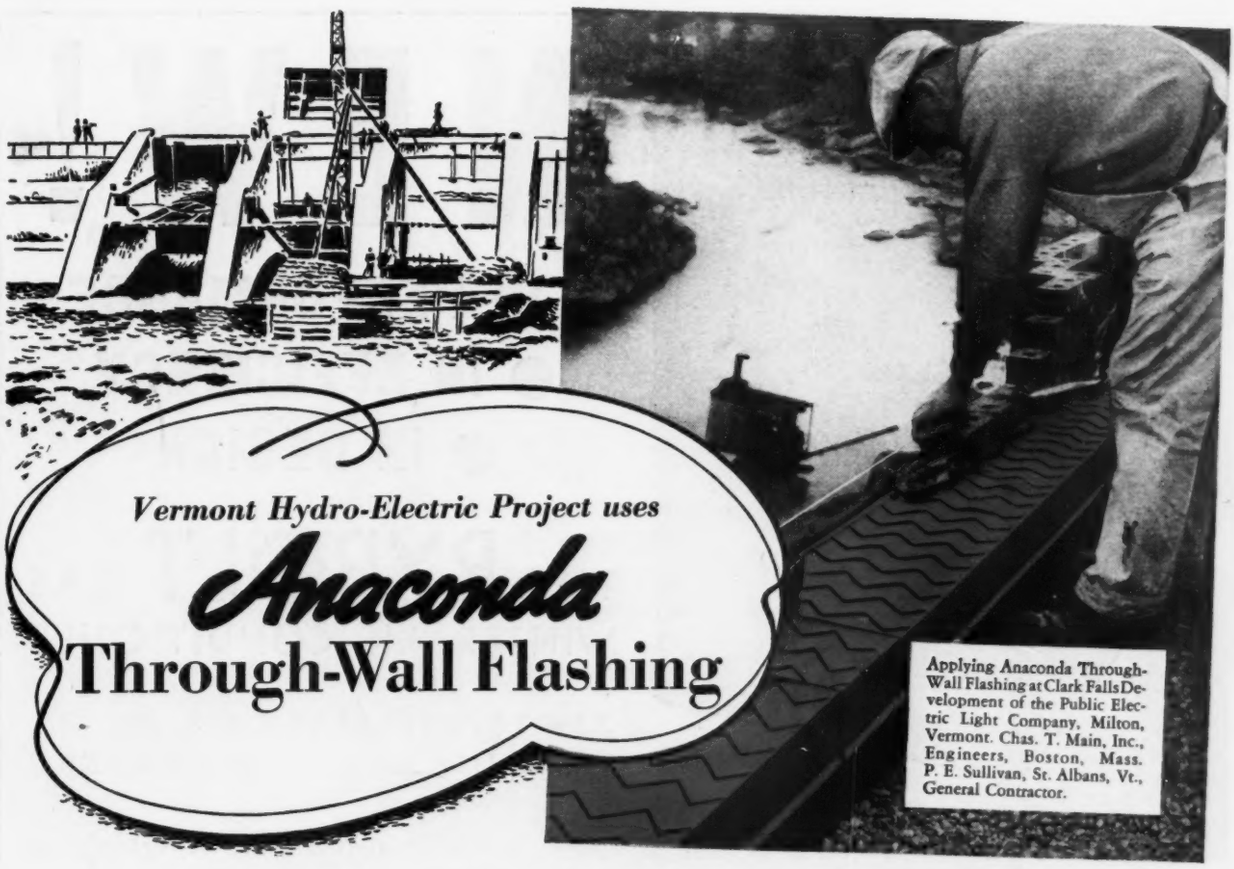
In 70 U. S. offices, qualified Trane representatives are ready with "Contact on the Spot". Address inquiries to the Trane Company, 2007 Cameron Avenue, La Crosse, Wisconsin.

Association with Trane is a valuable asset to any contractor, because Trane is a name known far and wide as a manufacturer of successful Air Treating Equipment.

TRANE

THE TRANE COMPANY AIR^{n} LA CROSSE, WISCONSIN

Also TRANE COMPANY OF CANADA LTD., TORONTO, ONTARIO

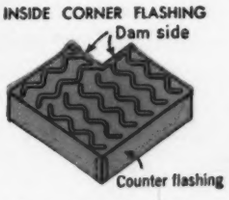


Vermont Hydro-Electric Project uses

Anaconda Through-Wall Flashing

Applying Anaconda Through-Wall Flashing at Clark Falls Development of the Public Electric Light Company, Milton, Vermont. Chas. T. Main, Inc., Engineers, Boston, Mass. P. E. Sullivan, St. Albans, Vt., General Contractor.

SIMPLE...POSITIVE...MODERATELY PRICED



Standard inside corner flashing unit. Dam on inside; drains out.

Standard outside corner flashing unit. Dam on outside; drains in.

A NEW USE FOR COPPER

24-oz. cold-rolled Anaconda Copper, chromium plated, was applied directly over the brick-work of the parapet wall—providing water-tight protection and eliminating the need of special masonry capping.

ANACONDA Through-Wall Flashing* is readily adaptable to almost every brick or masonry condition. This flashing has an integral dam throughout its entire length which gives positive drainage in the desired direction. A series of zigzag corrugations of the same height as the dam prevents lateral movement in any direction. It is easily locked endwise, simply by nesting one or two corrugations.

Made of 16-ounce Anaconda Copper, either plain or lead-coated, this flashing is available in 5′ or 8′ lengths, in a range of standard and special widths, and with various selvages. One-piece inside and outside corner flashings are available for both 8″ and 12″ walls. These are so designed that the corrugations will interlock with those of adjoining straight flashings, thus providing the same thorough protection at the corners as on the wall.

Anaconda Publication C-28 contains complete description of and suggested specification for Anaconda Through-Wall Flashing. 38113

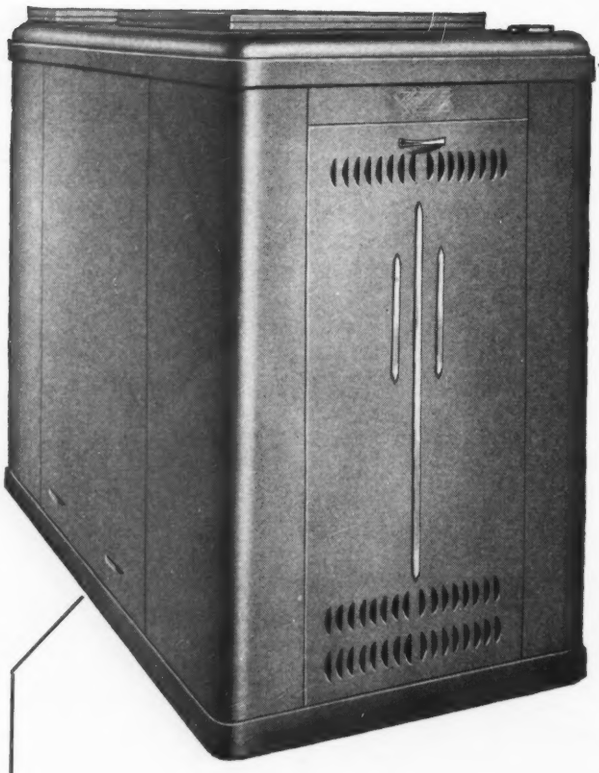
*Pat. No. 1,906,674

ANACONDA from mine to consumer

Anaconda Copper

THE AMERICAN BRASS COMPANY · GENERAL OFFICES: WATERBURY, CONNECTICUT

Offices and Sales Agencies in Principal Cities · In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ontario



NEW!

● IN PERFORMANCE
● IN EFFICIENCY
● IN DESIGN

THE RYBOLT GAS WINTER AIR CONDITIONER

NEW IMPROVEMENTS ACHIEVE UNEQUALLED ECONOMY and CONVENIENCE

THE Rybolt Gas Winter Air Conditioner is just the unit you heating men have been looking for. It combines everything necessary to heat and air condition a home economically and efficiently. In addition it's styled in the modern trend . . . dressed to the "queen's taste" in an attractively finished newly styled cabinet which will harmonize with any new or modernized basement. Also, the cabinet has been designed to facilitate easier and quicker adjustment and installation. A large panel in front lifts out and reveals the entire face of the heating units, together with the controls, everything right at hand. Side panels also provide easy access to the interior. A large panel in the back of the blower-filter cabinet can be removed so that in summer air can be drawn from the basement through the filters and circulated through the house to produce a decided cooling effect. All panels can be removed after the cabinet is erected without disturbing top or base.

This unit will be a sure-fire seller and you'll be able to scoop the competition in your territory with it. Check the following standard equipment listed here and convince yourself that the RYBOLT Gas Winter Air Conditioner is just the tonic for your spring and summer trade.

STANDARD EQUIPMENT INCLUDES Room Thermostat, Blower and High Limit Control, Electric Gas Valve, Main Gas Valve, Safety Pilot, Gas Regulator, Square-D Switch, Transformer, Vent Manifold, Draft Diverter, Blower with Electric Motor, Thermo-Drip Humidifier, Dustop Air Filters, and all necessary pipe connections for the unit.

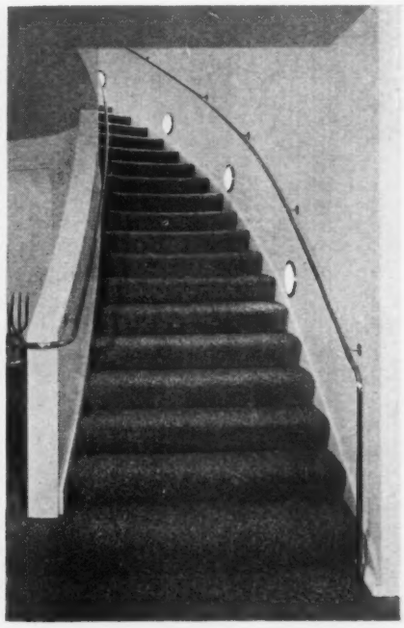
For large home installations the Sectional Control System is recommended. Write for specifications and sales assistance. We'll shoot it to you by return mail.

THE RYBOLT HEATER COMPANY
ASHLAND OHIO

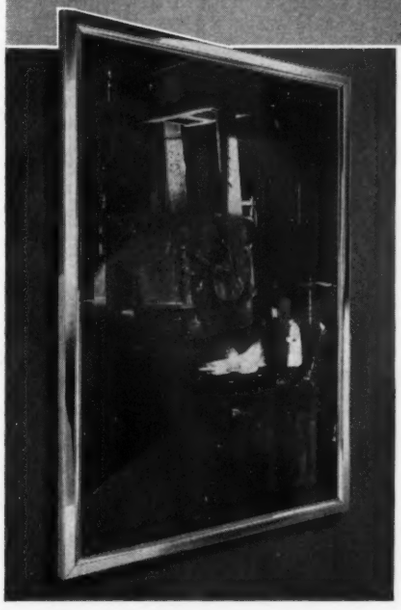
NEW WAYS TO *Profit* WITH U·S·S STAINLESS STEEL

One dye bucket like this started a whole brigade of orders. Because it stood up so well in service, that one stainless steel bucket persuaded the superintendent of a large dye house to change over his entire stock of buckets. The metal worker now derives a steady income from business from this source.

Every new home is a prospect for sheet products of U·S·S Stainless Steel. One metal worker had an idea that a stainless steel stair railing would be a saleable item in modern homes. Both buyer and seller are well pleased with this installation, because it lends a touch of dignity to the stairway and attracts favorable attention from every visitor.



Smart and attractive, is this picture frame formed from U·S·S Stainless Steel. A sales manager recently purchased 300 of them for use in announcing a new product. Everywhere they went, these bright, modern frames made a big hit, yet they cost less than frames of wood or other white metals, in the same size and quantity.



EVERY day some ingenious sheet-metal worker discovers a new product — a new opportunity for profit — in U·S·S Stainless Steel. Today it is frames or buckets or railings. What it will be tomorrow, we can only guess.

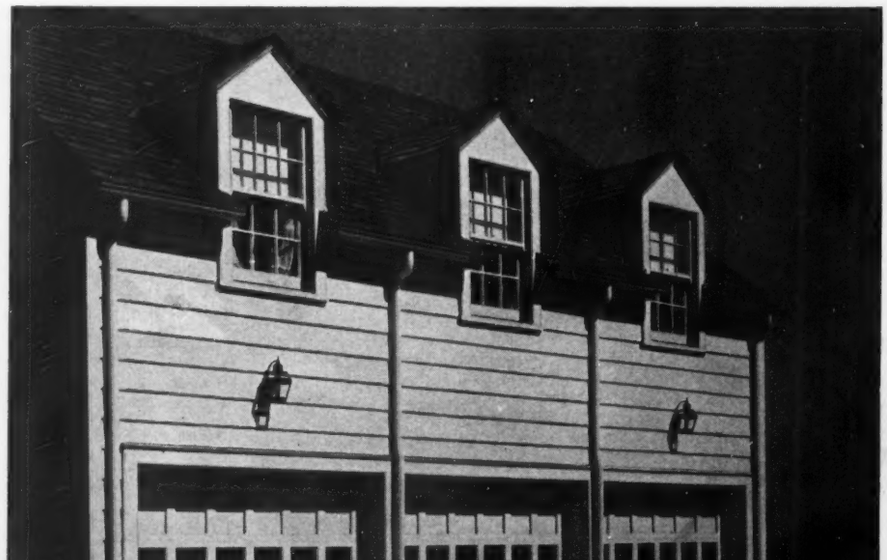
This brilliant metal brings profits to fabricators because of its happy combination of two important qualities: beauty and permanence. It never tarnishes, never pits, never loses its inviting sparkle. And it is the strongest commercial metal known —yet you can form it, machine it, and fabricate it with little change from standard shop practice, as employed for ordinary steels.

But most important of all—stainless steel products are easy to sell. They appeal to those who buy for utility as well as to those who buy for looks. Why not take advantage of the popularity of this metal and specialize in stainless steel installations. You'll find plenty of money-making opportunities. Write for full information on U·S·S Stainless Steel.

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
NATIONAL TUBE COMPANY, *Pittsburgh*

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · Scully Steel Products Company, *Warehouse Distributors*
United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL



Note how these ARMCO PAINTGRIP gutters and downspouts harmonize with the architectural design.

A Beauty Secret

THAT HELPS WIN SALES!

Beauty is an ace "salesman" with your customers. They always want to improve the appearance of their property. You can sell them beauty and protection too by recommending roof drainage systems made of ARMCO Galvanized PAINTGRIP Sheets. • Explain that this durable metal can be painted immediately without treatment of any kind; that it provides the full protection of galvanizing. Also tell them how ARMCO PAINTGRIP saves paint dollars. The specially processed PAINTGRIP coating helps keep paint flexible, makes it last longer without peeling or flaking.

Use this strong appeal for quicker sales and bigger profits. And be sure to point out that a base metal of ARMCO Ingot Iron is the best assurance of long-time, trouble-free service. The nearby Armco distributor has ample stocks of ARMCO PAINTGRIP sheets to give you quick service. Phone him or mail him your order. The American Rolling Mill Company. Executive Offices: 1791 Curtis Street, Middletown, O.

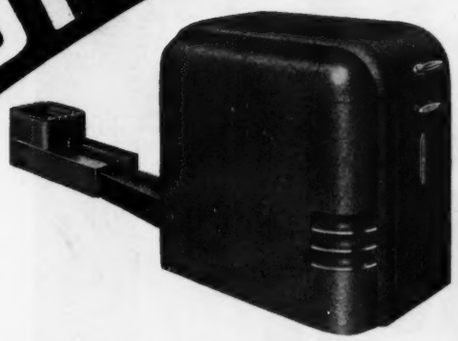
ARMCO

ARMCO PAINTGRIP SHEETS

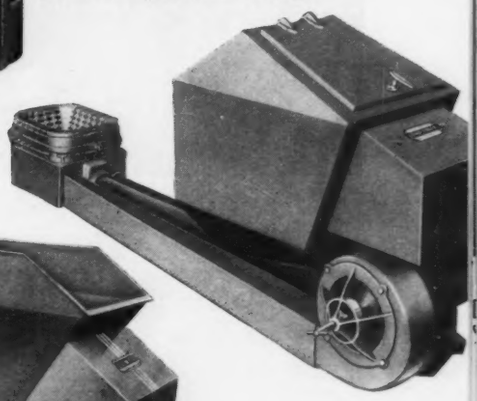
ON PARADE!

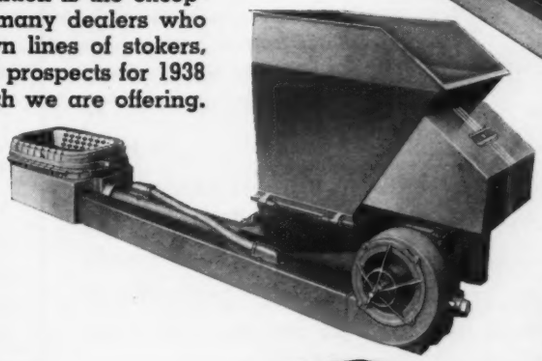
CONCO'S 1938 STOKER LIN

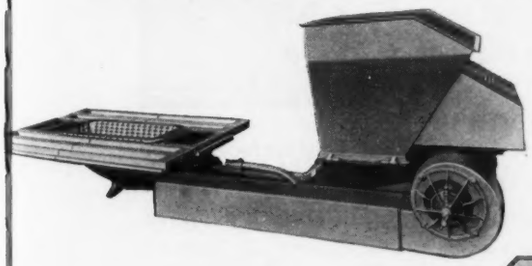
When you handle Conco Stokers you ne never lose a sale for lack of being able furnish the right size for the job. Look at t array of domestic, bin feed, and heavy d models! All engineered for the job requi of them. Each one stepped up in size, weig strength, and power, for the rating it engineered to deliver. Think what an vantage you have when you can step and put in your bid on every job! If y customer puts a domestic model in home, he is pretty likely to become sto minded and ask you to figure the cos an installation at his factory or place business (or vice versa).

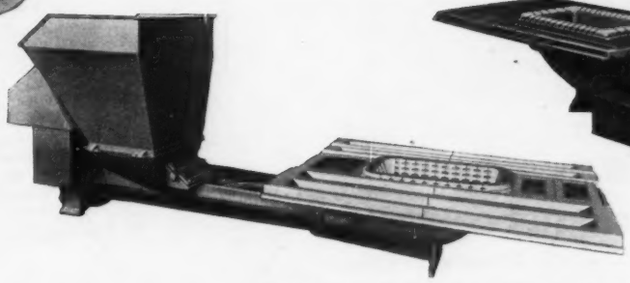


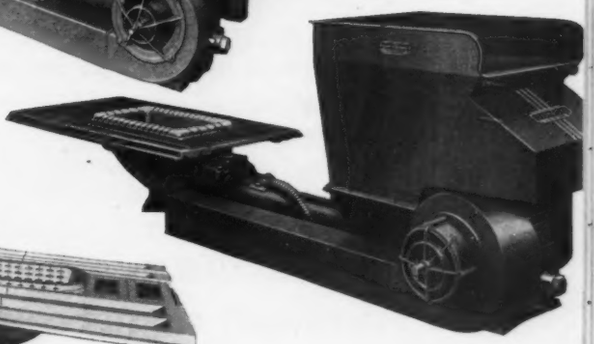
We've seen to it that these stokers are built right, and tested before leaving the factory. That's because we want to reduce service calls to a minimum. And that's one of the big reasons why our dealer army is growing by such leaps and bounds. That's one of the big reasons why Conco jumped to a tie for second place in stoker production in the entire industry last year! If you install your Conco Stoker right and properly instruct the purchaser as to its care and operation, service attention is the exception rather than the rule. We say boastfully that many dealers who have turned to Conco from other pretty well-known lines of stokers, are staying on with us and are enthusiastic over the prospects for 1938 with the improvements and dealer sales helps which we are offering.











Write
For Information Regarding
Dealer Franchise
Your Community

Right now is when stoker dealers are lining up their franchises, putt in floor models, getting ready for the selling season to come. We s simply, if you are not selling stokers at all, you are passing up r profit possibilities. If you are handling some other make and feel want to make a better connection, we think we have it for you. letter from you will bring details of our complete proposition, if y territory is still open.

CONCO - SAMPSEL STOKER CORPORATIO

BOX 111A • MENDOTA, ILLINOI

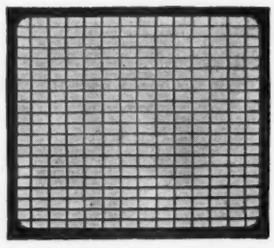
INDEPENDENT REGISTER

Leads to Meet New Needs

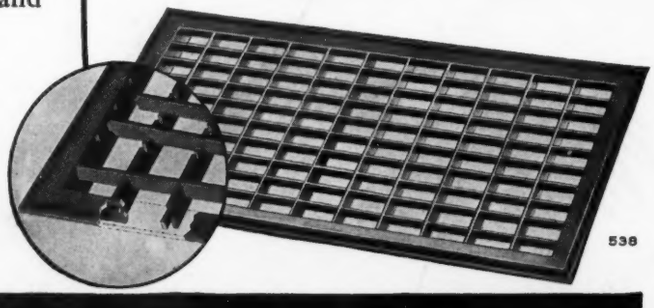
• Back in the days of the pipeless furnace, floor faces grew to great dimensions. Forty inches across was not uncommon. Here arose a need for greater strength and rigidity, and for larger free area, than the wrought and cast registers of the time afforded. Definitely to meet these needs Independent invented "Fabrikated." Immediately "Fabrikated" took the lead in register and floor face construction, a position it has maintained and outstandingly holds today.

Look to Independent "Fabrikated" for all your register and register face needs. Send for catalogs showing the complete line.

THE INDEPENDENT REGISTER COMPANY
3741 East 93rd Street • Cleveland, Ohio



At right is illustrated the first "Fabrikated" register face, made in 1915 and exhibited in the offices of The Independent Register Company. It is basically the same design as that of the latest "Fabrikated" cold air face, shown below with sectional view of construction, affording maximum strength, rigidity and open area.



538

INDEPENDENT "Fabrikated" (REG. U. S. PAT. OFF.)

FLOOR REGISTERS AND COLD AIR FACES
AND AIR CONDITIONING REGISTERS AND GRILLES

USAIRCO

LOW COST COOLING

for Homes, Apartments, Offices and Stores offers BIG PROFITS for YOU *this Summer!*

This is a BIG year for selling SUMMER COMFORT. The demand for "relief from the heat" is increasing by leaps and bounds. One of the most effective, inexpensive and increasingly popular methods of making homes more comfortable and livable in summer is offered by the

USAIRCO *Air Conditioning* EQUIPMENT

USAIRCO HOME VENTILATOR

For COOLING AIR Circulation

It brings "sea breeze" coolness to homes all summer. Proved by long service in many installations; offers the utmost in air circulating efficiency and long, trouble-free service. Quiet and economical in operation. Makes from 30 to 50 air changes per hour. Made in range of sizes that includes adequate capacity for any home installation; easily installed, attractively priced.

This unit is installed in the attic and is turned on in the evening after sundown. It forces out the stagnant air and stored-up heat, draws in fresh cool night air and distributes it throughout all rooms; creates refreshing air circulation and cools off the whole house. If doors and windows are closed early in the morning, the house will stay cool for many hours.

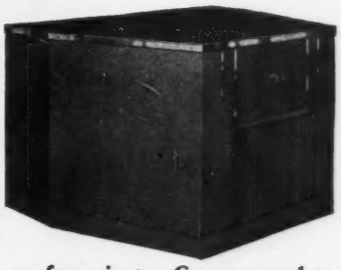
May also be used successfully for cooling and ventilating top floor apartments, offices, club rooms, dance halls; also stores, cafes, etc., having attics directly over them. There is an almost unlimited market for this unit.

Get Our Attractive Territory Franchise

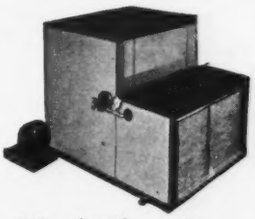
The USAIRCO program fits right into your set-up. USAIRCO offers a *complete* line of quality cooling, ventilating and air conditioning equipment. USAIRCO business paper advertising creates prospects for you. Let's get going!

USAIRCO *Midget* Kooler-Aire

FOR SMALL STORES, SHOPS, CAFES, OFFICES, ETC.



opens up a vast field for you among small business places. At amazingly low cost, it offers the same cooling efficiency enjoyed by thousands of theatres from large Kooler-Aire installations. Draws in 100% fresh air...washes, COOLS and circulates it, completely changing air every few minutes. Comes complete, fits into small space; quickly installed, no ducts.



USAIRCO HOME Air Conditioner

A properly engineered, efficient and proved unit for installation with warm air furnaces. Contains blower-filter unit and washer-humidifier unit. Four sizes. Get the interesting details.

Mail This Coupon Today!

UNITED STATES AIR CONDITIONING CORPORATION
MINNEAPOLIS . . . . . MINNESOTA

420 Lexington Ave., New York City — Phone Mohawk 4-0563
543 W. Washington Blvd., Chicago — Phone Dearborn 7443
In Canada—Canadian Air Conditioning Co. Ltd., Toronto, Ont.
Export Office—U.S. Air Conditioning International, Inc., 505 Fifth Ave., New York, N.Y.

UNITED STATES AIR CONDITIONING CORP.
2105 Kennedy St. N.E., Minneapolis, Minn.

Send literature on USAIRCO Equipment.....
Territory we cover.....
Name.....
Address.....
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They are a new type of craftsman—not plumbers, or steamfitters, or sheet metal workers, or electricians—but in a way a composite of all these crafts—men who know thoroughly every phase of heating, ventilating and cooling as applied to air conditioning, and also domestic and commercial refrigeration.

1000 hours of home-study, backed by two weeks (soon to be four) of intensive work in our shops in Chicago, where they have had to dismantle, rebuild, install and service all conventional air conditioning and refrigeration equipment—has made them probably the most practical and competent installation and service men ever produced for any industry.

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President

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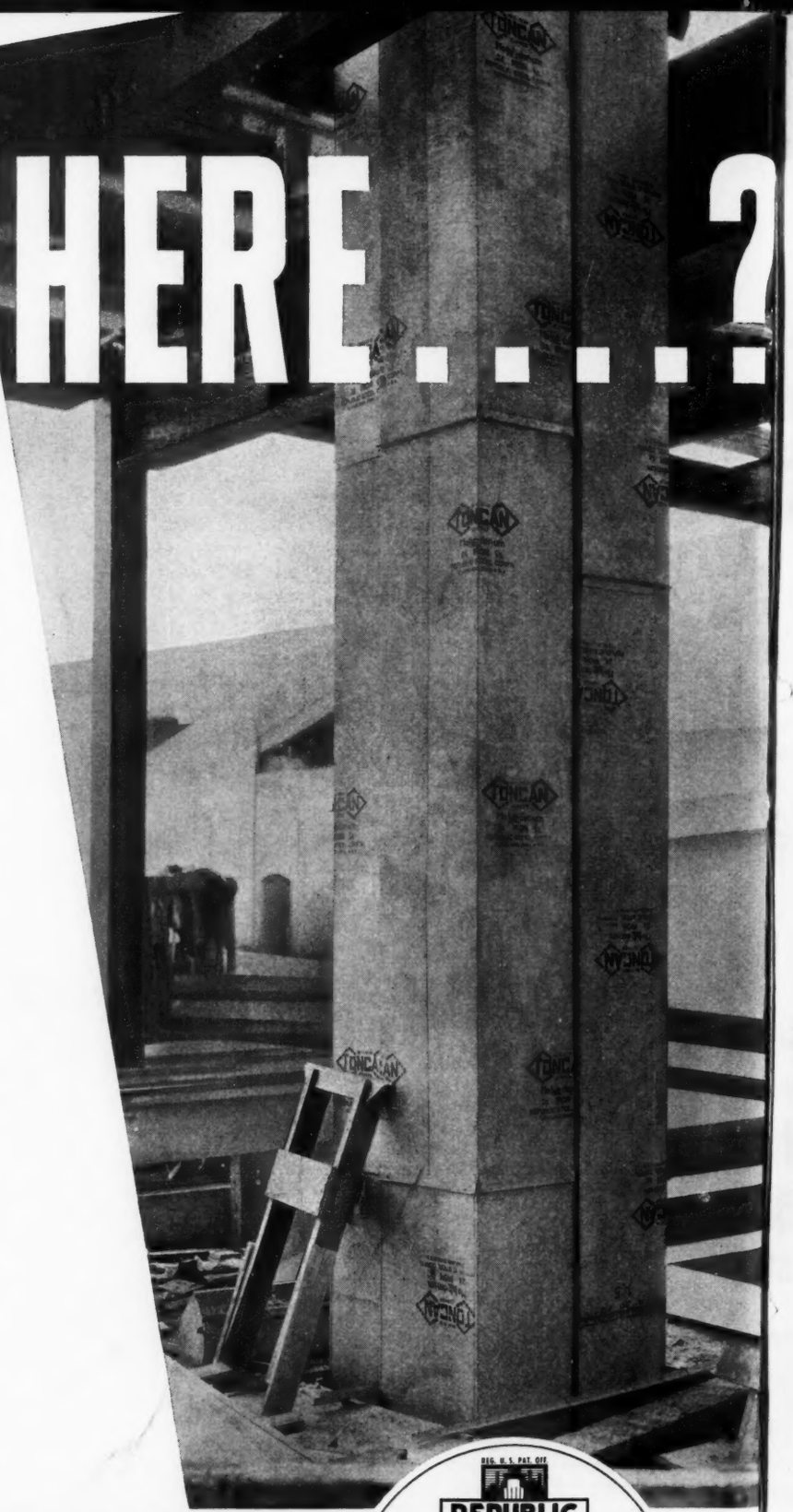

● On this duct job, the owner wanted a material that would resist rust and corrosion—that would last—that would protect him against the cost of replacement due to premature failure. So, the contractor used Toncan Copper Molybdenum Iron—the sheet with the highest rust-resistance in its price class.

Had it been an ordinary sheet metal job, the contractor probably would have used Republic steel sheets. They are uniform in quality, easy to work and suitable for all ordinary work. Again, had the job involved atmospheric corrosion, he could have used Republic copper-bearing steel sheets. Had it been a roofing job, he most likely would have used Taylor 40-pound copper-bearing roofing ternes. Or, if the job required the finest steel sheet available, either for resistance to corrosion or for beauty of finish, he could have used ENDURO Stainless Steel.

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AMERICAN ARTISAN

Volume 107 Number 5

The Small Shop *Can* Operate At Lower Cost

AT the recent convention of Ohio sheet metal contractors, a gentleman from Toledo told of a mechanical warm air heating job opened for bids with the make and model of furnace specified; also make and model of fan; also make and model of oil burner; plus an engineer's plan and specification—complete down to the last inch dimension.

As the story goes, ten bids were submitted by contractors who used the plan and specification. Three bids were submitted by contractors who thought their ideas were better. The bid prices of the last three were within fifty dollars of one another. But the bids of the ten using the plan ranged from a low around $950 to a high of $1450.

Now Toledo has a code (see this and the April issues) covering gravity installations, but no code for mechanical heating. The question was—Would a code reduce this spread in prices?

We are inclined to doubt that a code would prevent a spread. Perhaps the spread would not have been so great—but codes have not been advocated as a cure-all for spread bidding.

The problem, we believe, goes deeper into business methods. Unquestionably it costs some shops more to do business than it costs other shops to operate. For example, there is in this issue, an article showing overhead costs for 46 Philadelphia shops. The records of these shops have been broken down to show money and percentage costs of items of non-productive labor.

The chances are that on this Toledo job some of the low bids were submitted by small shops. The highest bids, likely, came from shops where the owner draws a salary and where other items shown in the Philadelphia record must be charged into the operations. The average salary drawn in these Philadelphia records and not chargeable directly to any one job or jobs accounts for 33 per cent of the overhead burden. Another 9 per cent goes for office help, full or part time bookkeeping, etc.

Now if this Toledo job should have been charged at the highest price ($1450) by the shop paying the owner a salary and having office help, the small shop without office help and paying the owner out of direct labor charged to the job (in other words the owner works with the tools and draws no salary) a reduction of more than 40 per cent could have been made by the small shop owner. Forty per cent of $1450 is $580. Then $1450 minus $580 equals $870.

As the article from Philadelphia points out, this matter of salary not chargeable against any particular job is worth serious consideration. Of course an owner, especially the owner who does not work with the tools, must draw a salary. But if a salary is drawn, then the owner must be able to justify his salary in increased volume, and reduced costs of operation by better management, or he cannot compete with the owner who works and draws no salary.

These Philadelphia records emphasize another interesting point. In the costs of auto and truck operation (13%), rent (8%), insurance (2½%), telephone and advertising (5%) there lie possibilities for the small shop to reduce costs and answer the question—"Does the small shop operate at less expense?" If savings can be made in these items plus savings made in salaries, truck cost and rent, then the small shop can do business for less and still live up to the regulations of any code.

This is not to say that small shop owners should not draw a salary. They should. If they do not, then why stay in business?

As Mr. John points out, the small shop and the large shop can both be legitimate, the real danger comes from the owner who does not know his costs and therefore takes work at prices ruinous to himself and the trade and from the owner who deliberately skimps the job in order to make day wages from too-low prices.

The first can be set right only by education—painful, detailed, year after year education by groups willing to give time and money to raise standards of business. The second can be corrected by codes which prohibit skimped jobs, thereby protecting the public and eventually forcing the skimping contractor out of business.

This industry and the public need codes. And we need more associations and more men willing to undertake the thankless task of making men make money.

Alamo of San Antonio

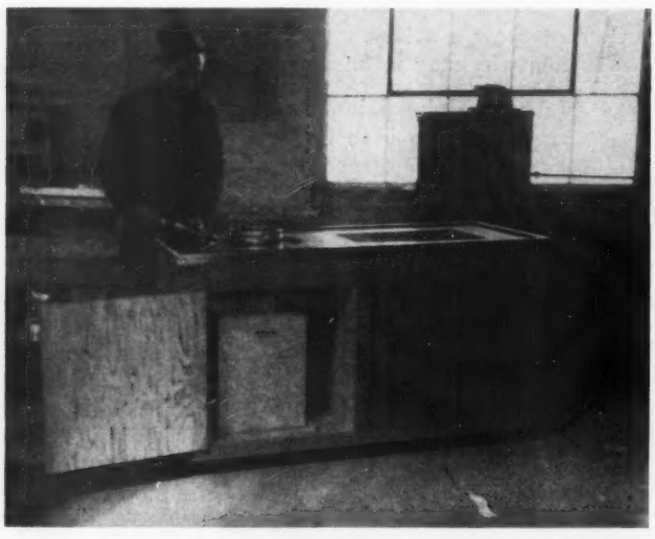
Program boards fabricated of black sheets trimmed with white metal are a steady production item in this shop. All joints are welded.

FAR down in Texas, in the city of San Antonio, where history was made in 1836; where the historic old Alamo attracts visitors from every state in the union; where the San Antonio river meanders through the business district between banks landscaped with banana plants and roses; where summer is a season to be reckoned with; where ranches embrace tens and hundreds of thousands of acres; C. F. Bonn and E. A. Fischinger operate the Alamo Sheet Metal and Roofing Co.

Organized in 1925 by G. H. Kuhlman and Mr. Fischinger to do a general contracting and job shop business, the firm is now owned by Mr. Fischinger and Mr. Bonn, both of whom have been in the sheet metal business since leaving school. While the firm still does a general sheet metal contracting business, roofing has been discontinued, in order that more time and attention can be paid to creating more and better sheet metal work.

During the past few years more and more attention has been paid to special work. For example, the Alamo shop is one of two firms in the area owning power machinery and, as a result, a great deal of work in heavy gauge is done for contractors not equipped with power machines. A great deal of work is done in 12 gauge or heavier; also a volume of work in white metal is handled for contractors and customers.

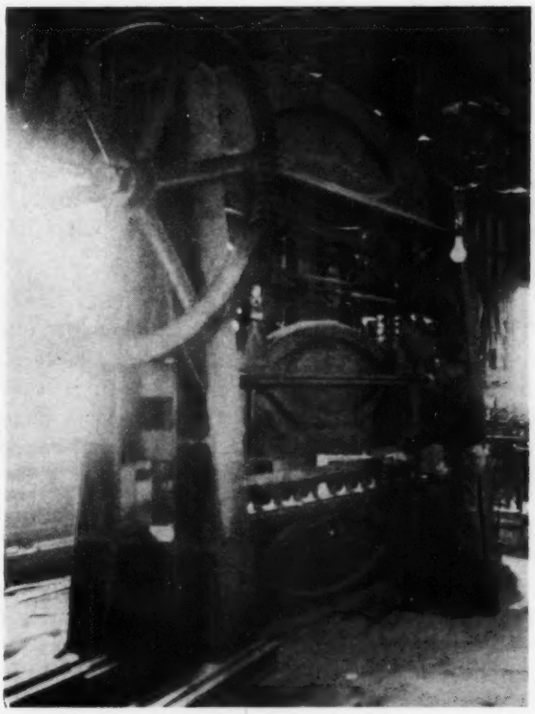
Since the change from job shop and roofing be-



All types of hotel and restaurant equipment are made to special order by the Alamo shop. At the left finishing touches are being added to a wood cabinet, stainless steel top sink and warmer. At the right a mechanic is using a rotary shear to cut discs from 12 gauge plate.

gan, items such as brine tanks, chutes and cyclones, dairy vats, restaurant and kitchen equipment, fireproof doors and windows, meter boxes, printers' galleys, awnings and canopies, tanks of all kinds, breechings and numerous special products in white metals have passed through the shop—some to become standard production items; others to fill in as specials on order.

At the present time several interesting items are in steady production. For a theatre supply house, the Alamo shop fabricates (ready for painting) the program board shown in one of the photographs. These boards are manufactured at the rate of about 10 boards a week. These boards are fabricated from steel sheet of heavy gauge from patterns developed by the shop. Sections are formed in the power presses and brakes and welded to form a one-piece unit. Stainless steel trim is used for the door frames. An outside paint shop applies the final finish.



Power machinery is used whenever possible. A volume of work is handled for local contractors who do not have power equipment.

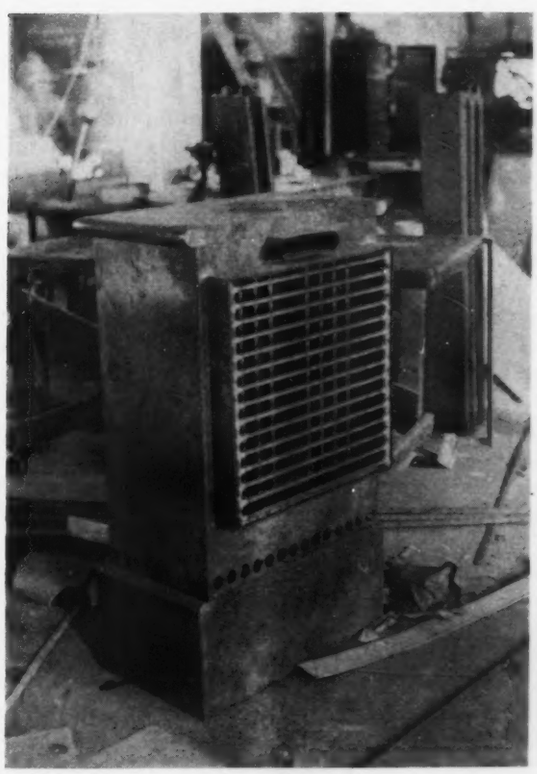
Quite a business, extending over a wide area, has been built up in hotel and restaurant equipment. Items, like dish cabinets, sinks, cupboards, dish warmers, coolers, are all made to special order from actual measurements of the spaces to be filled. For the better type of restaurant, all-metal units are made usually with galvanized iron bodies and stainless steel work surfaces. For lower priced units the cabinet is built up of plywood with metal exteriors and stainless steel work surfaces. In both types all work is done in the Alamo shop. One of the photographs shows a wood and stainless unit receiving final polishing.

An interesting item is the Butane gas burning circulating heater shown in another photograph which was designed to burn the local type of gas and is designed primarily for small commercial use rather than homes. This unit is fabricated from sheet steel in heavy gauge, with all joints welded and shipped ready for connection to the gas pipe and flue.

Tanks of all sizes and weights of metal are a steady item. These go to manufacturing plants, gas and oil companies, stockmen, for open or pressure storage. Pressure tanks are completely welded; open storage tanks may be locked or welded or soldered as use demands.

Tanks of all sizes, shapes, gauges are fabricated complete with the power equipment.

(*Continued on page* 43)



This Butane gas heater for commercial establishments has been a production item for a number of years.

Overhead Expense Items From Philadelphia Records

By Benjamin F. John
Philadelphia

RARELY do two shops have exactly the same overhead expense items in any one year. Even though two shops may be in the same neighborhood, doing the same kind of work, for the same class of customers, these items will be different. Yet ALL shops do have certain expense items (usually underestimated) of the same classification. These expenses often grow faster in amount than is realized, and frequently amount to from 50 to 60 per cent of the entire expense in any one year.

Charts made from the books of Philadelphia shops show these expense items mainly consist of:

1. Salaries paid to the owners
2. Salaries paid office help.
3. Wages paid to others whose work cannot be charged directly to any jobs.

Some Common Costs

The balance of the expense items (amounting to from 40 to 50 per cent) are many and varied as shown by the list Fig. 1, taken from 46 different shops doing a business of $7,800 to $75,000 a year. Some shops carry most of these items; others not as many and the amounts are different except for a few items common to every shop. The number and the amount of these items varies with the shop need, location, services rendered and the owner's business judgment. Some shops pay more than they should for certain yearly items such as taxes, because they overlook certain allowances to which they are entitled. The City or Town, State or Federal Government only make refunds of overpaid taxes when a claim is made and proven.

It is these overlooked items of overhead expense that eat up the profit. In most instances, when the shop owner realizes the total, yearly amount of these missed items and adds them to the cost of his jobs, more profit is realized.

The usual claim that low prices are due to competition is true in a certain proportion of jobs. However, in the average jobbing shop the books show that the largest number of jobs or the largest amount of business done is from regular customers with little or no competition. The true reason for prices without profit on these jobs is that the true cost, including the proper proportion of the expense, is NOT KNOWN.

In those shops where the true expense was determined and added to material and labor costs, on all bills and estimates, there was seldom any complaint of "high price." No two shops have exactly the same overhead percentage. Where a shop has definitely determined its OWN overhead expense and added it fearlessly, there has been little difficulty in obtaining a profitable price, even from shrewd owners and agents, when accompanied by a fair degree of salesmanship. This seems to prove that the jobbing shop owner will not give his money away deliberately when he really understands what he is doing.

Must Know Own Overhead

This can only lead to one conclusion—that low prices, without profit or little profit, may be largely eliminated when shop owners find their OWN OVERHEAD. Actually, the majority of jobbing shops do not believe their actual overhead expense cost until shown by their own books or records.

The objection in Philadelphia to using overhead on productive labor was largely due to the size of the figure 100 per cent (double the labor on the cost sheet), but when the total expense was compared with the total productive labor there was little objection.

In the interest of better prices, the 100 per cent on productive labor or, as an alternative, 45 per cent on productive labor plus material, was suggested as a fair overhead percentage for the jobbing shop who could not or would not find its own expense. Gradually these figures were adopted by shops not in the association and proved helpful as shown by the increasing number of statements received and the decreasing amount of debt. Some shops, after a trial, desired to check up more carefully on their individual expense. As a result some shops decreased the percentage, but generally the ease with which the 100 per cent could be added plus the desire for a safety factor, made most of the shops cling to this method. Even today when 100 per cent is too low due to increasing income taxes, compensation liability and truck insurance and other items, the 100 per cent factor is used.

The effect of the increase in the expense items was felt between 1925 and 1926, but the increase in volume from 1926 to 1930 again overcame the increase. In 1928 on a volume of $500,000 only one shop showed a loss and that was 32 cents. 1931 showed the largest loss as volume dropped to $300,-

(*Text continued on page* 36)

Fig. 1—WHAT IS OVERHEAD

Here is a complete list of all items in the OVERHEAD of 46 shops in Philadelphia.

			Percentage of Total Overhead
NON PRODUCTIVE LABOR:			
Owner's Salaries (Average—$32.13 per week)	$ 95,750.87		
Less Owner's Productive Labor—11 6/10%	11,173.00		
Total Salaries Drawn by Owners—not directly charged to jobs or customers		84,577.87	33 %
Office Help, Part time Bookkeeping and Auditing		22,456.05	8 7/10%
Lost Shop Time (Cleaning, estimating, repairs, arranging, etc.)		39,943.55	15 5/10%
TOTAL "DEAD LABOR"		$146,977.47	57 3/10%
AUTO AND TRUCK EXPENSE:			
Gas, oil, repairs, depreciation, garage rent, insurance, etc.		$ 33,052.54	13 %
RENT:			
Rent for Non-owner's or charged as such	$15,122.00		
Taxes charged as rent	1,972.84		
Interest on Mortgages charged as rent	3,765.43		
		20,860.27	8 1/10%
SALES ADJUSTMENT:			
"Comebacks"	$ 2,741.50		
Discount and Allowances to Customers	5,963.12		
Commissions paid	3,257.19		
Collection expense	698.88		
"Bad Debts"	6,370.04		
		19,030.73	7 4/10%
INSURANCE (Compensation, Fire, Public Liability, Hold-up)		6,105.70	2 4/10%
TELEPHONE and advertising service in phone book		5,694.26	2 3/10%
OTHER ADVERTISING		6,087.74	2 4/10%
HEAT AND LIGHT		3,938.00	1 5/10%
DEPRECIATION ON EQUIPMENT (not automobiles)		2,432.80	1 %
STATIONERY AND PRINTING		1,784.45	7/10%
GENERAL REPAIRS (not automobiles)		1,454.87	5/10%
ASSOCIATION DUES		1,188.25	4/10%
DONATIONS		756.35	3/10%
SPECIAL HAULING (not chargeable to jobs)		680.78	2/10%
POSTAGE		637.94	2/10%
OFFICE CLEANING, SUPPLIES, TOWELS, ICE, ETC.		502.75	2/10%
BANK CHARGES AND CHECK TAX		253.03	1/10%
CARFARES		156.70	1/10%
UNDIVIDED CHARGES: Mercantile license, permits, Dun & Bradstreet service, traveling and sales expenses, blue prints, building reports, subscriptions, first aid, finance charges, safe deposit box rent, sales tax, dump charges, watchman, and other small items too numerous to mention (averaging 107.55 per shop per year)		4,947.70	2 %
TOTAL OVERHEAD		$256,552.33	100 %

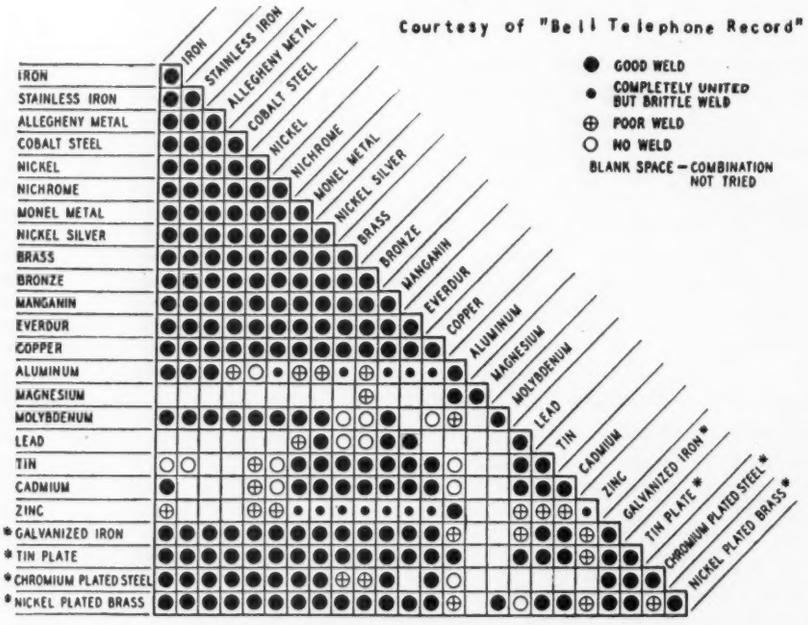
Resistance Welding* [Part 5]

By L. H. Frost
Welding Engineer
Electric Controller & Mfg. Co., Cleveland

IN THE previous discussion, only mild-steel welding has been considered. In addition to the welding of mild steel, resistance welding is successfully and widely used for fabricating from special sheets and alloys, as well as non-ferrous metals. Special sheets commonly used are galvanized, terne plate and tin plate. Other sheets are available such as chrome-plated sheets. Alloys and non-ferrous metals used for welding vary widely in composition, but some of the most common ones are brass, Everdur, stainless steel, aluminum and high-carbon steel.

In the welding of coated sheets, it is necessary to melt the coating and then the steel, and to forge the steel together to form a strong weld. This implies that the coating will be removed when the weld is made, and this is generally the case. In some instances the coating may be of such character that it will alloy with the steel, forming a strong weld, and has a melting point so close to that of steel that fusion and alloying take place without disturbing the coating outside the weld area.

Inspection of Table I, giving melting points of various metals, reveals that the chrome-plated sheet will satisfy the above-mentioned requirements since its melting point is close to that of steel, and further it alloys with steel to form a strong weld.



* IN THE COURSE OF SPOT WELDING COATED MATERIALS, THE COATINGS FREQUENTLY DISSOLVE IN THE OTHER METALS PRESENT OR BURN AWAY

CHARACTERISTICS of spot welding of some 250 combinations of metals. This study was made by Lawrence Furguson of the Bell Telephone Laboratories, Inc. As in spot welding of steel, an essential detail is the choice of a suitable electrode tip. For welding high resistance materials such as iron, nickel, nichrome, and nickel-silver, electrode tips of copper are suitable. Where greater strength or longer life is required, however, a copper rich copper-tungsten alloy is advisable. For low resistance materials such as copper or aluminum, tungsten tips are the best as they do not easily alloy or weld at ordinary welding temperatures.

In spot welding these materials it is necessary, as in the welding of mild steel, to melt the metals at the desired spot, then forge together and remove the application of heat. Depending upon the nature of the material, it is necessary to apply heat and pressure in proper relationship, some materials requiring relatively low heat and low pressure and others high heat and high pressure. This is necessary to a greater degree than when welding mild steel.

*Reprinted by permission of The Welding Engineer, Chicago, and the author from a series of articles—"Theory and Application of Resistance Welding."

Zinc Coating Melts at Low Temperature

Galvanized iron, however, acts differently. Its zinc coating melts at a much lower temperature than steel, and the zinc-iron alloy (if it alloys) is weak.

Table 1. Melting Points of Various Metals

Metal	Melting Point, °F.	Metal	Melting Point, °F.
Tin	450	Copper	1981
Lead	621	Manganese	2300
Zinc	787	Nickel	2646
Antimony	1166	Chromium	2768
Magnesium	1204	Steel	2786
Aluminum	1218	Platinum	3191
Silver	1761	Molybdenum	4500
Gold	1945	Tungsten	5400

Table 2. Electrical Resistance with Respect to Copper
(Copper = 1.00)

Metal	Resistance Factor	Metal	Resistance Factor
Silver	.95	Nickel	4.5
Gold	1.4	Platinum	5.8
Aluminum	1.6	Steel	5.8
Chromium	1.6	Tin	6.7
Magnesium	2.7	Lead	12.8
Manganese	2.9	Antimony	24.2
Tungsten	3.2	Stainless Steel	35.0
Zinc	3.5		

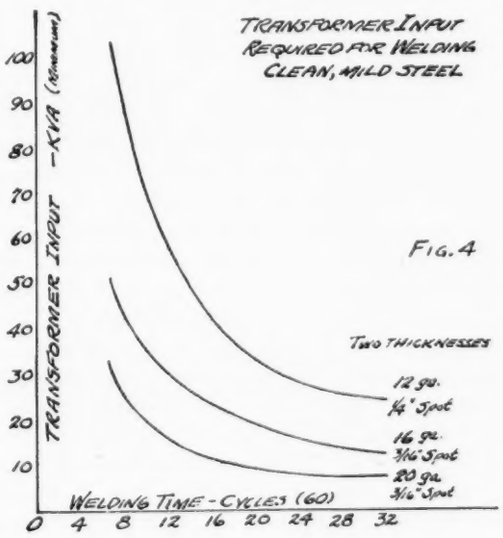
In this case then, it is necessary to remove the zinc by application of high heat and this results in the coating being burned away at the weld.

Since the heat available is determined by the resistance of the coating and the steel, this combination further affects the proper application of pressure and current. The electrical resistance of different metals varies widely, as Table 2 shows. For example steel has a resistance 5.8 times that of copper, and stainless steel has a resistance 35 times copper.

Transformer Capacity Galvanized Steel

To illustrate how this information is used, assume that two sheets of 20-gauge galvanized steel are to be spot welded. From Fig. 4 it is found that 10 to 30 kva. transformer capacity will be required for clean mild steel, depending upon the welding time. In the case of zinc, which has a melting pont of 787 deg. F. (see Table 1), while steel melts at 2786 deg. F., it will be necessary to use a short welding time to avoid burning or melting away a large amount of the coating. Thus, it is evident that at least 30 kva. will be required, assuming a welding time as short as 8 cycles, on 60-cycle current. Table 2 shows that the resistance of zinc is 3.5 while steel is 5.8. Hence, to generate the same amount of heat between zinc surfaces would require

$$\frac{5.8 \times 30}{3.5}$$ or 50 kva. However, the amount of heat required to melt the coating is less than for steel because of its low melting point; hence, a capacity of less than 50 kva. and more than 30 kva. is needed. Experience indicates that this analysis is correct, since 40 kva. is found to be required for welding this sheet.



Welding Galvanized Sheet

In the welding of light-gauge galvanized sheet, sometimes holes are burned through the sheets even when low-heat taps are used. This is due to too low a pressure. The zinc not only melts but becomes gaseous and forms an arc, burning a hole through the light-gauge steel. This can be corrected by insuring that pressure remains on the work after the current has stopped flowing, and also that the pressure is increased to its proper value. Very little success has been attained in welding galvanized steel without destroying the coating on the outside surfaces. It is possible, however, to weld this material without seriously burning the outside surfaces. Under favorable conditions welds having a thin coating of zinc still left on the outside surfaces have been made in production set-ups.

With careful control of current, timing and pressure, as well as careful maintenance of electrode points, welds having little surface indentation may be obtained.

As shown above, high currents are required, in general, for proper galvanized-steel welding. Short welding times are essential for minimum surface disturbance, these ranging from 4 to 8 cycles, based on 60-cycle current. The electrodes found most desirable for such work have spherical or ball points or tips. In production set-ups it has been found that frequent dressings, compared to clean mild steel, are required. For several dressings or cleanings, fine emery cloth may be used to remove any zinc deposited on the tip. A file should **not** be used. Other dressings should be made in a lathe or other suitable machine which will give true surfaces. Hard copper alloys may be used to advantage. The maintaining of the electrodes should not interfere with production if it is done systematically.

Several solutions are available for coating the surface or weld spots after welding. These solutions are said to deposit zinc salts which resist corrosion and thus retain the original corrosion-resistant properties of the sheet.

Welding Terne and Tin Plate

The welding of terne plate or lead-coated sheets and tin plate is similar to that of galvanized steel; but since the electrical resistance of the coatings is more than steel, the same transformer capacity as for steel is satisfactory. The same remarks also apply, as made regarding electrode materials and tips for galvanized steel. As in the case of galvanized sheets, it is almost impossible to weld these materials without surface mar and removal of the coating. One method by which the coating of one surface may be relatively well preserved during the welding operation is by using a large, flat electrode on one surface and a ball-end electrode on the other. In some instances it has been possible by this method to make welds in which substantially none of the coating was removed from one side. Due to the spread of the current and the larger thermal conducting area of the large electrode, higher currents will be required than with two ball-end electrodes. This applies to all coated sheets.

Welding Chrome or Special Coated Sheets

There have recently become available sheets with special coatings. One of these is chrome-plated sheets. In the welding of this material, which is supplied with a high polish, it is often desirable to leave no indication of a weld on the outer surfaces. By the use of the large flat electrode mentioned above, it is possible to minimize the surface disturbance, though it cannot be entirely eliminated. The disturbance is more noticeable on thin sheets and takes the form of a crater. With pure-copper electrodes, the edges of the crater will gradually rise above the surface as the electrode wears. This crater may be only 1/10,000 in. deep and still be noticeable because of the highly polished surface. The crater is formed by the contraction of the metal on cooling after welding. The flat surface of the electrode maintains the outer surface while the weld is being made and the inner surface is molten, with the result that, upon cooling, the metal that was molten causes the outer surface to become concave due to the contraction.

The welding of other special coatings may be analyzed as outlined above, the principal factors being the consideration of the melting point and the electrical resistance of the coating. It is also necessary to consider the metallurgical angle in that in some cases the coating will alloy with steel and this has some bearing on the resultant weld as regards both strength and surface appearance. There are also coated sheets having some other material than steel for a base, and in these it is also necessary to consider the above factors.

Overhead Expense Items of Philadelphia Shops

(*Continued from page 32*)

000 with little drop in the expense. From 1932 to 1934 (with about the same volume) more profits were shown because the expense items were cut and the percentage for expense increased. 1935 and 1936 showed further improvement as more shops kept strict account of the individual expense items. In 1937 added unemployment and old age taxes and some other State and local taxes will require a boost in the percentage or an increase in volume in 1938. A preliminary survey shows the effect of these taxes and the decrease in volume in the latter months of 1937.

Every shop (large or small) has certain fixed charges that do not vary much from year to year and which are absolutely necessary to carry on business. Whether business is good, fair or poor these charges remain about the same and there is not much chance to reduce them very much. Of course, these amounts vary widely with the size of the shop, the character of the business done and services rendered, location, etc., and the business judgment of the owner.

It requires a certain portion of any one year's business to pay these fixed charges. Just what this portion is, may only be determined from the books. The balance of the expense to run the business must, then, be paid and a final profit obtained, from the balance of the business done, over and above that portion required to pay the fixed charges.

This means that the fixed charges such as rent, heat, light, taxes, owner's salary, etc., should first be found at the beginning of each year. Then the amount of incidental expense should be calculated from the expenses of several years previous and an amount set out for the coming year. Then, by estimating the amount of expected business during the coming year (from previous years), a percentage of this total dollar volume sufficient to cover the three items of fixed charges; incidental expenses and profit can be figured. This is the basic overhead volume. Expenses or services which are outside this fixed charge can only be adopted if volume is increased or prices raised.

The reason for loss in the majority of instances in Philadelphia was found to lie in the fact that actual expense during the year was NOT known. Because a percentage for Profit was added to the supposed cost, it was difficult for some shops to understand why, with the jobs finished on time and the material cost slightly less than estimated, there was no profit at the end of the year or month. We often hear of jobs taken, "just to cover overhead to keep the men going," but if a shop does not know its true overhead, how can it know if it is covered?

Ohio Convention Dips Into Some of the Costs of Doing Business

MEMBERS of the Ohio Sheet Metal Contractors Association held their 1938 convention on April 19, 20 and 21 in Columbus. The program committee, believing that most interest, this year, lies in legislative and business problems, presented almost no engineering, a very mild dose of merchandising, but covered such problems as accident insurance, unemployment compensation costs, Ohio sales taxes, and the problems of the "little" business man.

"Little Boy Blue"

On the first evening, in addition to the buffet lunch and entertainment, James Daly, Columbus, secretary of a traveling salesmen's association and delegate to the small business men's conference in Washington, explained how this conference in Washington was conducted, and what (in his estimation) was actually accomplished.

Listening to Mr. Daly it was not difficult to appreciate that a thousand little business men, each with a different idea for curing the depression, would constitute a hectic gathering in anyone's back yard. Very vividly, Mr. Daly described the scene, each business man trying to attract the attention of the chair and demanding time in which to present his pet cure-all; from all parts of the huge assembly arms waving, papers in the air, individuals screaming for attention—this was the background of the conference.

Mr. Daly explained how the various committees were organized and briefly outlined the recommendations of the conference, now familiar to everyone. Mr. Daly did emphasize the importance of the recommendations for government loans to the small business man. (See Arnold Kruckman's Washington Letter in this issue.)

Ohio Sales Tax

T. R. Johnson of the Ohio Sales Tax Commission, declared that too many critics of the Ohio sales tax law forget that the revenue derived from sales taxes is badly needed in Ohio and if this source of revenue is abolished, the same amount of money must be collected through some other means. Not being familiar with the provisions of the Ohio sales tax law, it was difficult for the editors to understand all of the ramifications discussed, but it seems as though the same problem which is bothering other states—who shall collect the tax, and who shall pay the tax—is bothersome to Ohio contractors. There evidently is in the Ohio law some differentiation between the tax laid upon a total contract price and the tax laid upon a contract which divides the labor, materials, profits and overhead. Considerable discussion centered around the provision in the law which states that if a product such as a sheet of galvanized iron is sold by the contractor to the customer without any fabrication work entailed, the sales tax is collected by the contractor from the customer on the price of the galvanized iron. On the other hand, if the piece of galvanized iron is formed, or bent or cut, the tax may be levied upon the total billing to the customer, or, if the fabrication is segregated from the material, the tax is levied upon material only. If a new furnace is installed in an old house and no alterations are made on the existing duct work, the tax may be levied upon the total price billed to the customer, or may be billed upon material only, providing a breakdown bill is rendered to the buyer.

Workmens' Compensation

J. W. Beall of the Ohio State Industrial Commission, speaking on Ohio workmens compensation rates under the Ohio law, emphasized that too few contractors realized that employers set their own rates, depending upon the accident record of the industry. Also, that all costs of administration are paid from Ohio State general funds in order that all monies paid in by contractors shall go into the accident fund and not for administration purposes.

When the Ohio law was drawn in 1912, contractors were assured that this law would eliminate all need for insurance companies, lawyers, law suits, and other objectionable characteristics of accident insurance. The speaker consumed considerable time in explaining that due to a faulty wording in the law, "functional" disability cases have now become somewhat of a racket with lawyers taking cases for one-third to one-half of the total amount received and fighting for the maximum $4,000 of payment, whereas the law originally intended that a disabled person might draw compensation up to the time the person was able to return to his employment.

Mr. Beall stated that today the commission is receiving approximately 1,000 new claims every day and suggested that all employers follow each case and show some interest in the causes of the accident and also in what is done for the injured person after the accident takes place.

Unemployment Compensation

George Smith, of the Social Security board, Ohio office, outlined briefly the unemployment relief law and its payment, and stated that at the present time the problem of casual help was foremost among the difficulties encountered by the division. He sug-

gested that casual help (in other words mechanics working one or two days a week with perhaps more than one week intervening between employment periods) should establish themselves as "seasonal" employees and be so recorded in the Ohio lists.

The Well Dressed Shop

W. M. Ward of Chicago, speaking on the subject of new and improved equipment for sheet metal shops, declared that in his experience Ohio shops find among their many problems that of meeting low costs submitted in error or deliberately, necessitating reduced costs through improved equipment to meet the situation.

As a specific problem confronting many shops Mr. Ward pointed out that hourly wage rates are from 30 to 50 per cent higher than they were 18 months or two years ago and in spite of the fact that there are less working hours per week there has been no reduction in the hourly rate. Meanwhile overhead, coupled with high taxes and fixed charges for supervision, insurance, etc., has actually advanced because this fixed overhead must be applied against a reduced volume of business. In Mr. Ward's estimation, one method of meeting this situation is the modernization of shop equipment, including the purchase and use of new type machines which speed up operations and thereby reduce cost.

As an example of improved equipment, Mr. Ward cited modern bending brakes which will take care of the close bends demanded in today's fabricating processes. The working parts of these new brakes, such as the nose, apron and bed, are polished to a high degree to eliminate scratching or marking of polished metals. These improved bending brakes are available in small sizes and in power equipment of 1 to 1½-ton size. As another time saving tool, the power hack saw can save many hours of tedious labor in cutting, notching, shearing, of light structural shapes.

Lock Forming Machines

Mr. Ward cited the fabrication of duct work using Pittsburgh Locks, formerly made on the hand brake in eight operations and pointed out how the modern, small, power-driven forming machine will make Pittsburgh locks in one operation with one man at the rate of approximately 800 linear feet of metal in 22-gauge in 45 minutes as compared to approximately 9 to 12 hours for two men to make the same amount of Pittsburgh Lock upon the hand brake. Also, modern power-operated machines are available for making flanges on sheet fittings at the rate of 15 to 25 feet per minute as compared to the present method of using a hand machine for turning up the edge on irregular contours.

The History of Our Codes

Fred R. Bishop of Detroit, reviewing the history of the gravity and two mechanical codes, started back twenty years when each individual had his own pet method of figuring heat loss; no one knew exactly what the capacity or correct rating was for any particular make of furnace; and no one knew exactly how much heat could be delivered under gravity flow by an 8, 9 or 10-inch pipe; and the furnace generally was considered as a "cheap" type of heating plant and was purchased primarily by the home owner who felt that he could not afford anything better. Mr. Bishop briefly reviewed the history of the Western Supply Association organized in Omaha and the Inland club organized in Chicago, resulting in 1918 in the formation of the original National Warm Air Heating Association. He outlined briefly the original research program entered into with the University of Illinois in 1918 and paid credit to Professors Willard, Kratz, Day, Konzo and all of the others who have contributed immeasurably to the progress of warm air heating.

Mr. Bishop briefly reviewed the early editions of the Standard Code, and subsequent changes

He reviewed such factors as 9, 6, 5, 800, 60, etc., and explained their derivation and application. Mr. Bishop paid credit to J. C. Miles who first advocated fan systems and explained briefly some of the difficulty Mr. Miles encountered in convincing the industry that mechanical warm air heating was

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both practicable and advantageous. Some of the drawbacks of the first edition of the mechanical heating code in 1934 were explained together with some of the limitations and how these problems have been satisfactorily solved in the new technical code based upon the direct Btu method of figuring heat loss and the equal friction per linear foot of duct in sizing pipes.

The Armco Movie

Through the courtesy of American Rolling Mill Company, Armco's manufacturing procedure and progress in research and development of materials was shown in moving pictures of the various processes in the manufacture of galvanized iron and black sheets, automobile body sheets, stainless steel and special alloy sheets. The hundreds of products manufactured from all of these different grades of sheets and types of materials were portrayed, and some of the important steps in research which have been formulated and advanced by American Rolling Mill Company were emphasized.

Residential Air Conditioning

A. F. Frazee, Airtemp Sales Corporation, Dayton, Ohio, speaking on air conditioning and the new home market, said many contractors feel that the automobile manufacturers and kindred corporations have no sanction in this field and that this might have some foundation in fact if these large corporations were manufacturing ordinary furnaces, oil burners, and other equipment. Mr. Frazee declared that perhaps the large corporation has contributed little to date in the way of advances in heating practices and heating equipment, but that they have contributed inestimable quantities of money, production facilities, and merchandising knowledge in all phases of cooling and summer air conditioning. That, in his judgment, the old-line furnace manufacturers can contribute three primary things, namely—

1. Better products and laboratory research.
2. Cheaper products, designed especially for the market of the $2700 to $3500 annual income.
3. Merchandising programs equal to the programs of the washing machine, the radio and refrigeration manufacturer.

Mr. Frazee declared that he believed the old line furnace manufacturer and the new large corporation must eventually join hands in order to secure for the heating and air conditioning industry our legitimate part of every consumer dollar.

The Franchise Problem

Admitting that every good contractor has already been solicited many times to accept franchises for heating and summer air conditioning equipment, Mr. Frazee declared he believed all of the new manufacturers are primarily interested in higher prices in order to provide a service "reserve" which can only be set up by larger profits per installation. The hesitancy of sheet metal contractors to ask these legitimately higher prices is compelling many of the large manufacturers to establish their own sheet metal fabricating departments.

Declaring that the residential market is today the weakest spot in the air conditioning picture, Mr. Frazee pointed out that only commercial installations have made any notable progress to date and that like many other industries purchase of cooling equipment for residences may not come about until cooling of commercial establishments and industry is more firmly established.

Architectural Preferences

Mr. Frazee presented some very interesting data bearing upon the problem of the residential market, such as Architectural surveys show the Cape Cod house to be preferred by 5 per cent of all home owners; Early American by 7 per cent; "Modern" by 8 per cent; other types 17 per cent; English, 20 per cent; Colonial 43 per cent. Further, that the over two-story house accounts for 5 per cent of all structures built, the 1-story house for 26 per cent of all construction, the 1½-story for 34 per cent and the 2-story house for the balance.

1938 Price Range

Regarding the selling price of homes, data shows that houses costing under $5,000 constitute 26 per cent of present production; houses costing over $15,000 account for 6 per cent of the market; houses costing from $10,000 to $15,000 for 14 per cent of the production; and houses costing from $5,000 to $10,000 for 54 per cent of present construction. As to the number of rooms, the preferred research discloses that 5 rooms or under account for 32 per cent of all houses being built; over 7 rooms 12 per cent; 7 rooms, 16 per cent; and 6-room houses for 40 per cent of present construction.

The Status of Fuels

As to fuel preferred, hand fired coal is preferred by 40 per cent of all home owners, gas fuel by 25 per cent, oil by 27 per cent, stokers by 8 per cent of all home owners. At the present time, approximately 85 per cent of all new houses are insulated in some degree. Also, very interesting was the statement that 50 per cent of all new homes are now being built with some phase of air conditioning included in the heating or cooling equipment. Quite startling to many contractors was the chart showing there are still two building peaks, April and October, but the national curve is very nearly flat throughout the year, indicating that winter construction is gaining headway in the Northern part of the country and that 12-month construction is a practicability in the southern area.

Composite Home (1938 Model)

A composite house preferred by present day builders would be of the Colonial type; would have 6.4 rooms; be of brick veneer construction or composition siding or clapboard; would be 2 stories high; partially insulated; would be heated with a warm air furnace, automatically fired; have a recreation room; and cost approximately $5,600. The cost of the lot would be approximately $1,200. As a forecast of construction for 1938 in residences only, Mr. Frazee disclosed that building contractors estimate 318,000 houses for 1938, the government estimates 400,000 houses and the actual need is more than 750,000 houses. Just what figures should be accepted will have to be left to the individual contractor.

Entertainment

Under the combined sponsorship of the salesmen's auxiliary and the local Columbus committee, some very fine entertainment in the way of floor shows, vaudeville acts, singing and dancing and excellent food was provided on both nights of the convention. Also the ladies were entertained interestingly by the local ladies committee of Columbus.

Monel Drainage System on a Residence

By R. C. Nason

A RECENT residential sheet metal contract of more than passing interest is that of W. R. Robinson Co., sheet metal contractor, of Elmford, N. Y., wherein about 3 tons of light gauge Monel metal is being furnished and installed on a new 20-room structure at Irvington-On-Hudson, N. Y. The contractor's work includes all usual architectural applications, plus several original features.

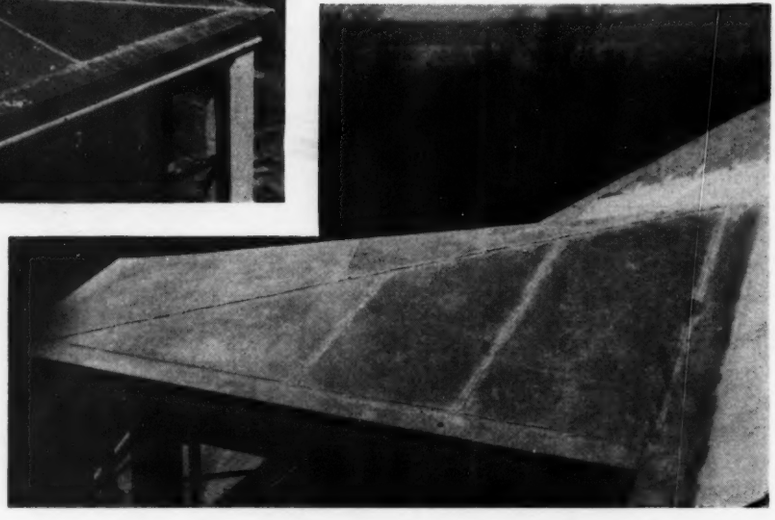
To get a true picture of the job it should be explained that the house, of three floors, includes a main structure and a servants' wing. On the outer end of the larger division there is a 15 ft. by 20 ft. sun room. Its shaped, pitched roof is being equipped with a standing seam Monel roof of 0.021 in. thickness. This gauge is typical of the sheet metal work throughout. Where the roof joins the building the connection is well flashed with Monel.

Four bay windows on the first floor, two on each of the major sides of the building, will also have Monel flashing and roofing. Seven additional dormers on the roof are Monel-roofed and flashed, but covering is of flat seam type. Miscellaneous flashing of this material includes valleys, chimneys, windows and all other customary applications.

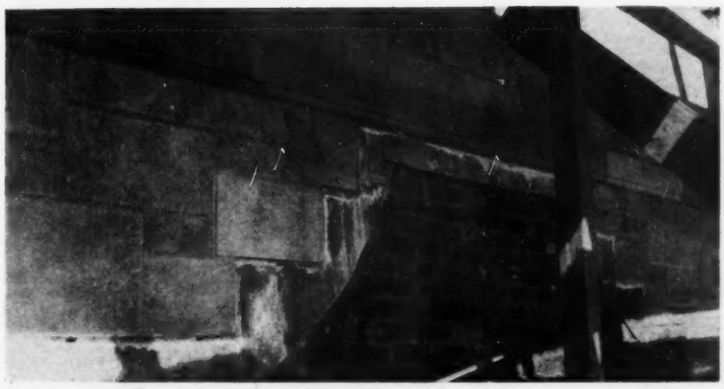
The part of Mr. Robinson's contract that required greatest tonnage is the gutters. They are generously sized and extend entirely around both main building and wing. As the area of the wing is less than that of the main structure, gutters are shorter. Still, they are 96 ft. long, versus the 250-ft. length of Monel gutters used on the larger section.

Having fabricated gutter sections in his shop, they arrived on location in 8-ft. pieces ready for erection. In some cases where fitting required shorter sections and special formations, as in making expansion joints, these were made up at the building on a hand brake set up there.

Preceding attachment of gutters, the Robinson mechanics built and installed two-sided wooden forms, or backers, to which gutter bottoms and frontal pieces were attached. The wooden shapes were secured to ¼-in. thick by ¾-in.



Two views of Monel sheets applied in flat seams, soldered, to roofs of dormer windows. Note flashing soldered to roofs and cleated under slate roof to be applied later. Note special type of rolled edge gutter used.



Left—Monel flashing set into wall where sun room roof will join the wall. On facing page, exterior of large residence during construction with scaffold for erecting gutter.

◆

wide galvanized steel supports terminating between walls and eaves. The sheet metal sections then were fitted onto these backers, clipped at their top edges with Monel clips and edges locked over clips together with gutter linings. As was true in all other joints except expansion joints, seams were well filled with soft solder.

Gutter backs were carried up beneath heavy roofing paper sheathing. Proximity of roof dormer sills to gutters made it essential to flash beneath sills, 1 ft. up the pitched roofing and similarly on the sides of dormers. At appropriate points snouts were soldered to gutter bottoms for attaching 3½ in. by 4 in. Monel metal leaders.

Another interesting feature in this job is 10 ventilating louvres of the same material. The kitchen has one 6 in. by 10 in. Others 6 in. by 12 in. were installed in the sides of three "false" chimneys.

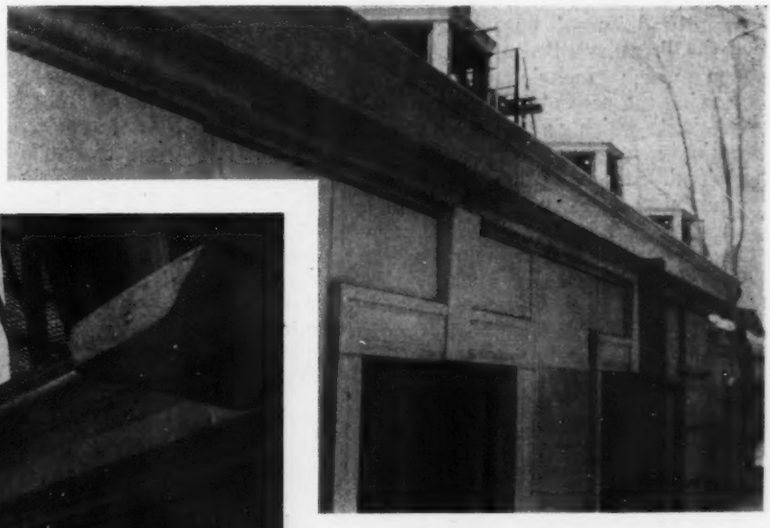
To explain, altogether there are apparently five chimneys on this residence, three on the main section, two on the wing. Only two will act as chimneys, the remainder are ventilating shafts to exhaust attic heat and for architectural embellishment.

The ceiling of the third floor is scarcely 5 ft. below the ridge of the main structure. As this space is without windows, ventilation was required. The chimney-ventilation shafts are grilled at their base while above the ridge the sheet metal contractor installed two Monel louvres on the side of each "chimney." Weather protection is provided by lining the flues of this metal. The flue tops are closed.

In reference to expansion joints used, contractor Robinson emphasized that free movement of 0.186 in. per 10 ft. must be compensated for through a temperature change of 200 deg. F. Otherwise seams may break under expansion and contraction of the sheets, which are rigid and resist buckling.

While no difficulty was experienced in soldering joints, the sheet metal contractor advised that following thorough cleaning of metal to be joined, zinc chloride base flux, slightly more acid than is used for copper, works well. Either high or low tin solder may be used successfully. In most instances Mr. Robinson tinned the edges of sheets before lock seaming. Although either torch or iron can be used, the most important feature is being sure of the complete sweating of the solder.

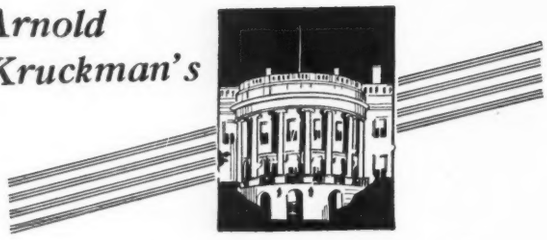
The dwelling concerned here has limestone walls; its cost is said to exceed $75,000. After W. R. Robinson Co. has completed the sheet metal work they will lay slate roofing over all major surfaces.



Right—Completed Monel gutter on main building. Note soldered section joints and cutouts for window keystones.

Left—Closeup of gutter mitre with a leader thimble ready for connection. The contour of the gutter is quite elaborate.

Arnold Kruckman's



Washington Letter

ESTIMATES assembled from the Procurement Division of the Treasury, and from other agencies of the Government, indicate that between two billions, five hundred millions and three billions dollars will be spent on some form of public works under the President's "pump-priming" program. The funds naturally will be spread over all states and territories and possessions and will be spent upon state and municipal works, as well as upon Federal jobs. Even general figures defining the allotment between highways, dams, and similar improvements, and buildings, are not yet available in order to make any clear statement. The impression here seems to be that the larger part of the total will be spent upon new Federal buildings, on new schools, hospitals, orphanages, state buildings and municipal structures.

This huge building expenditure makes especially interesting figures recently discussed by technologists of the Treasury's Procurement Division which include break-downs showing the percentage of the building dollar which goes for sheet metal work in buildings constructed by Federal, State and municipal government. On structures generally classified as public buildings, the Procurement Division estimates the expenditure for sheet metal varies from three cents to ten cents per building dollar. The high figure includes the installation of ventilation systems or complete air-conditioning.

Air Conditioning Costs

The Procurement experts declare that air-conditioning costs for a large public building range from ten to fifteen per cent of the total building cost. They estimate that at least one-half of this sum is spent for duct work. They say the chief reason for the relatively high percentage of the building dollar which goes for sheet metal work is due to the fact that the large building must be ventilated by means of ducts and must also contain large quantities of sheet metal for flashing, skylights, roof-covering, down spouts and gutters. It seems to be the feeling that all public and semi-public buildings to be built under the "pump-priming" program will use sheet metal in this accepted relative proportion.

Sheet Metal on Houses

The Procurement Division estimators calculate that between one and a half to four cents out of the building dollar are spent on sheet metal in erecting private buildings, especially in building the average small home. The wide variation is ascribed to the use, in some instances, of metal roofing and the installation of warm air heating systems. These uses, occasionally, are said to raise the average as much as one hundred per cent.

The figures have special interest on account of the drive that is being made by the FHA to modernize old homes and to induce the public to build new residences. In five weeks the business of FHA under the new law grossed approximately two hundred fifty million dollars, including the small new homes, modernization insurance loans, and multi-family enterprises.

Slum Clearance

During the past month the U. S. Housing Authority has earmarked $255,466,000 for a long range slum clearance program in New England and the South. Pennsylvania, Ohio and New York each have been allocated $50,000,000. A quarter billion dollars remains undisturbed. Inner New Deal circles are dissatisfied with the drag in the development of the slum clearance program and privately consider it a failure.

Fix Up Your Own Shop

It appears curious that apparently few business men realize that *they* may borrow money under the FHA guarantee for the purpose of fixing up *their own* stores, shops, factories, warehouses, garages, or any other place in which they carry on business. Like all others they may borrow up to $10,000 to renovate, remodel, refurbish or to replace old equipment or to secure new fixtures that are a permanent part of the establishment. They may obtain an insured loan even if they do not *own* the premises. Tenants are eligible for modernization loans when they have a lease that runs at least six months longer than the loan.

Loans for Equipment

Aside from obvious repairs and modernization, loans will be guaranteed for any permanent addition to the machinery of the establishment such as refrigerators, heating-plants, air-conditioning systems, plumbing, and any new equipment that may reasonably be classified as a permanent and integral part of the business structure. Since it is difficult to define such additions exactly as they apply to different kinds of business, those seeking insured loans may easily secure rulings on their especial needs. The tendency of the FHA is to be liberal in interpreting a classification to fit a genuine need.

Who Makes Loans?

Also interesting is the fact that the FHA will guarantee loans negotiated through a reliable finance corporation, or even through a material or equipment dealer, or contractor, who is able to handle the paper properly. One of the main things to remember in planning to negotiate an FHA loan is that the finance agency must be approved by the FHA. For this reason it is wisdom always to start by first going to the nearest FHA agency. They are located in 63 cities. If you are in doubt about the location of your nearest agency, write me care of AMERICAN ARTISAN and I will let you know.

Modernization loans usually are arranged to run 5 years. Unquestionably the necessary extensions can be arranged for those who honestly require the accommodation at the end of 5 years. A loan usually can be arranged within a week—very often within 24 or 48 hours.

Those who wish to secure straight construction; and to help existing

loans, *and cannot secure accommodation at their banks,* are now able to get funds quickly through the RFC, (Reconstruction Finance Corporation). Note especially that the primary condition of securing a so-called "Small Business Loan" is that your bank will *not* do business. The assumption is that you are *not* irremediably insolvent. Under such circumstances you will have little difficulty in negotiating a loan, particularly if the loan means that more people will be employed. Any expansion that increases employment will receive the swiftest and most sympathetic attention. There are 32 RFC agencies in the United States. Each agency serves a certain region. If you do not know where your regional agency is located write me care of AMERICAN ARTISAN.

RFC loans are practically the same as bank loans, except that the terms are more liberal and, at this time, there will be more tolerance in considering assets. The RFC loan is largely a character loan. The quickest and most direct way to negotiate an RFC loan is to get your data together, much as if you were going to your bank, and then go to the man in charge of the nearest RFC agency. With the understanding that his assistance does not constitute a definite commitment, he will help you in every way to secure the loan.

Loan Purposes

Loans under $25,000 will be made upon simple sworn financial statements and the usual references, as well as a statement of the purpose of the loan. Loans over $25,000 may require a special audit by RFC accountants. Loans, of course, are made for a variety of purposes. But most loans are made to hire more labor and to buy materials; and for the purchase of machinery and equipment; or to finance industrial enterprises to expand into new fields. Loans also are made to establish new business enterprises; and to pay existing indebtedness and taxes. The loans may be made for one purpose, or for a combination of any or all of them. Creditors are expected to cooperate with a "standby" agreement. In some cases loans will be made to businesses that are bankrupt or are in the hands of a receiver, if there is a reasonable chance that the loan will restore the business to solvency.

Security Required

Funds will not be advanced to finance new inventions, nor to obtain patents, or to pay for litigation, or for personal needs. Broad tolerance will be exercised in determining security. Collateral enumerated in Circular 13 (Revised), includes first mortgages on real estate, plant and equipment; assignment of warehouse receipts; first mortgages on chattels. Legal, audit, and similar professional services, may be employed in arranging the details of a loan; but no commission may be paid to any one. While the loan is unpaid, salaries received by officials must be satisfactory to the RFC, and dividends may be paid only if approved by the RFC.

It will take from 48 hours to two weeks to complete the negotiations for a loan. The object is always to place the funds in circulation, at work, as rapidly as possible. The swiftness with which the funds are made available depends largely upon the precision and definition of the applicant's data, and how near or how remote he may be from Washington. The general process is practically the same as when you negotiate a loan at a bank. Obviously the farther you are removed from Washington, the longer it takes to exchange airmail letters and telegrams. Circular 13 (Revised) contains a broad general outline of the whole plan under which the RFC will put out this one billion, five hundred millions, in loans to business. If you wish a copy, go to your nearest regional RFC agency, or write to the Reconstruction Finance Corporation, Washington, D. C., or ask us to get it for you.

Washington Grist

The Department of Labor reports that there has been a very sharp rise in the number of building permits issued throughout the country. . . . Bureau of Agricultural Economics and the Bureau of Labor Statistics report that the white collar worker has lost almost a third of his annual income since 1933. Before 1933 he averaged between $2,500 and $3,500 per year. Today his income averages between $1,500 and $2,000 annually. The wages of labor, artisans and professional and technical workers, on the other hand, have risen.

Trade treaties are now pending with the United Kingdom, Australia, the Union of South Africa, New Zealand, and Canada. Fourteen trade treaties are already in existence. The recent Czechoslovakian trade treaty has opened our trade to Czech shoes and glass at such low prices, on account of the low cost of labor in Czechoslovakia, that shoe factories and glass factories in America are seriously investigating the possibility of transferring their plants to Czechoslovakia to take advantage of the low-priced labor. By reason of the Czechoslovakian treaty the same tariff reductions have been made in imports from Belgium, the leading glass manufacturing country of Europe. Belgium has the lowest-priced labor on the Continent. American manufacturers are also contemplating transfers of activities to Belgium.

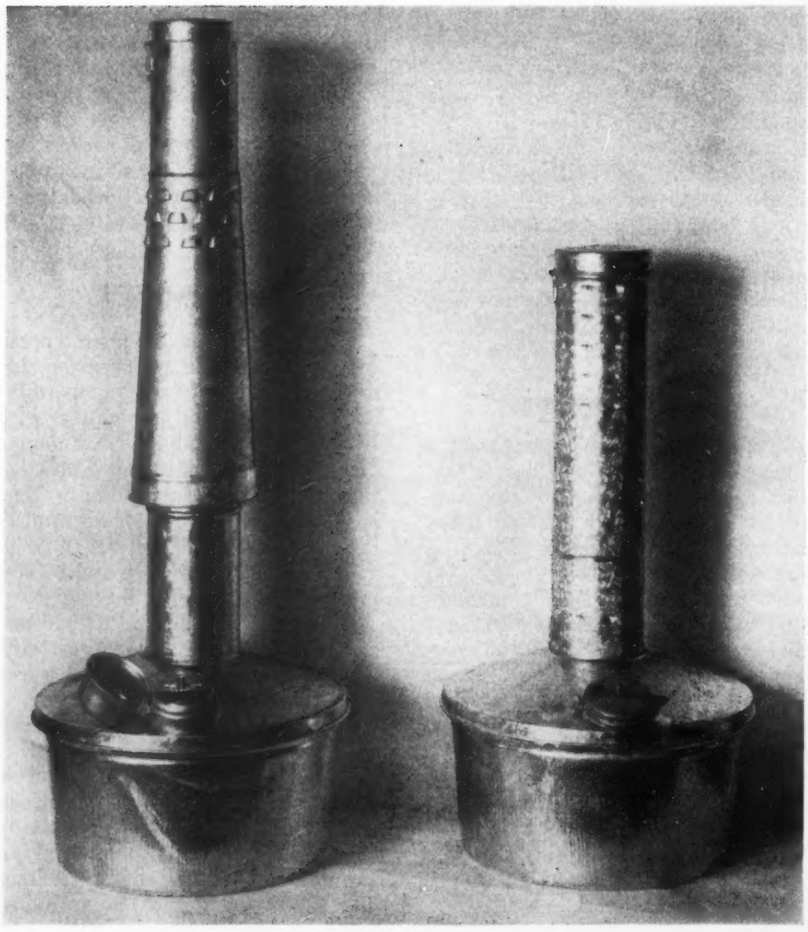
Alamo of San Antonio

(*Continued from page* 31)

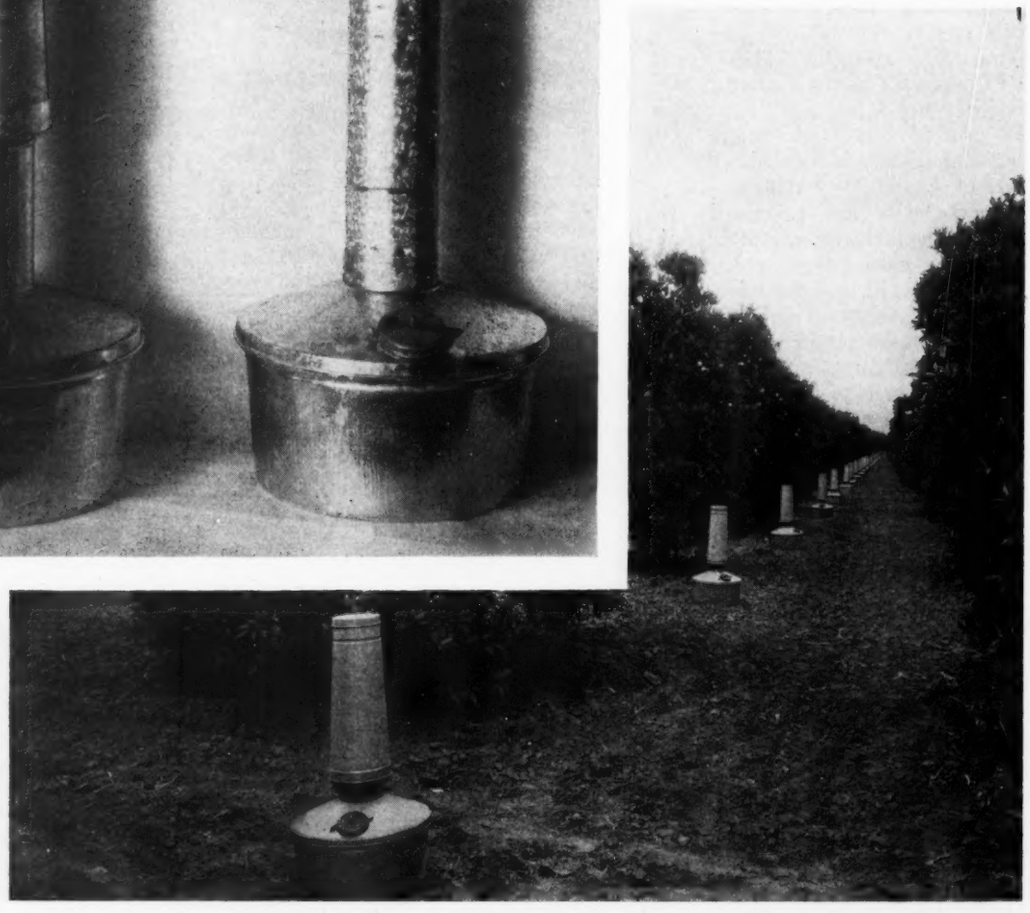
San Antonio is interesting to the visitor because of the long stretches of canopies which cover the sidewalks. The hot summer sun makes such canopies desirable; as a result most business establishments have canopies and the Alamo firm has all types to its credit. A recent canopy 200 feet long was built for a self service firm of galvanized iron with Monel facing and trim with a galvanized iron roof and plaster ceiling.

So far the firm has not entered the heating field. Some work has been done in air conditioning, fabricating and erecting duct work for San Antonio air conditioning firms who have no sheet metal shop.

Says Mr. Bonn—"We are constantly adding new equipment to handle newer types of work. We take pride in turning out as neat a piece of sheet metal work as can be found in Texas, whether that work be in stainless steel, white metal, or just plain steel."



Left—Closeup of a typical orchard heater (HY-Lo) showing construction of chimney and fuel pan and a row of heaters ready for operation in a citrus grove. On the facing page two photographs taken the same day showing a grove not smudged and with foliage and fruit ruined and a protected orchard saved by heaters.



Orchard Heaters

OVER 5-million galvanized heaters are set out in California orchards whenever radio broadcasts warn of approaching frost.

Viewed from an airplane this glowing forest of stoves—each burning 4 to 5 gallons of oil nightly over an expanse of 100,000 acres—presents a scene whose beauty could be especially relished by any metal man who happened to be looking down. For here is one of the largest single outlets for the products of the shop. Repairs and servicing alone keep a lot of welders and shearmen busy. While replacements (average heater life: 5 years); exchange (due to obsolescence and new county legislation) plus new sales to freshly planted groves, all are a boon to jobbers, salesmen and proprietors of the region.

Moreover a still wider market seems probable. As southland winters become progressively more severe, smudging increases; its use is even now being extended to tomatoes and similar field crops.

In the manufacture of orchard heaters an important factor of design is the proper provision for smoke control so that the job will comply with recent ordinances.

At first a mere nuisance, the growing number of stoves in use blanketed whole regions in a smoke pall which, decreasing normal heat from the sun,

made longer burning hours necessary and thus aggravated the conditions of dangerous fogs on the highways and soot-laden air which menaced the health of the public.

Visual checking of the total smoke emission, as practiced in industrial areas, could not be carried out since orchard fires are lit after sundown.

Civic effort to abate smoke was opposed by old-school ranchers. They clung to the belief that smoke, of itself, was a remedy against frost. Such stubborn notions date back to 1896 when orchardists first began experimenting with frost protection.

In those days it was officially contended that smoke and steam were the only natural antidotes. Accordingly, great bales of smoldering straw were placed along the tree rows and larger fires lighted to windward. The old superstition began to wane a bit when local sheet metal firms introduced a line of coal burners. Though unsatisfactory in many respects, the early types proved that heat was at least as important as smoke in fighting cold.

Then Max George of Pomona and other metal shops of the district, began tinkering with oil. At first this fuel was simply fired in open pails. The price per 100 of these units was quite reasonable of course from the consumer's standpoint, but the ranchers got very low "mileage" from their oil.

Gradually, improved heaters were evolved wherein the burning rate might be controlled and all oil in the reservoir consumed. They still smoked pretty badly, but the customers didn't mind. Many of them still felt that a certain amount of smoke had its virtues—while the general public, alive to the vital importance of the citrus industry, patiently choked through long nights of smudging. For years, no real effort was made to improve combustion.

It took the big freeze of 1922 to demonstrate that heat—not smoke—saved the crop. Incidentally, this battle against nature also proved that successful frost-fighting depends upon a large number of relatively small fires. Thus was born the wide market for the modern "pot."

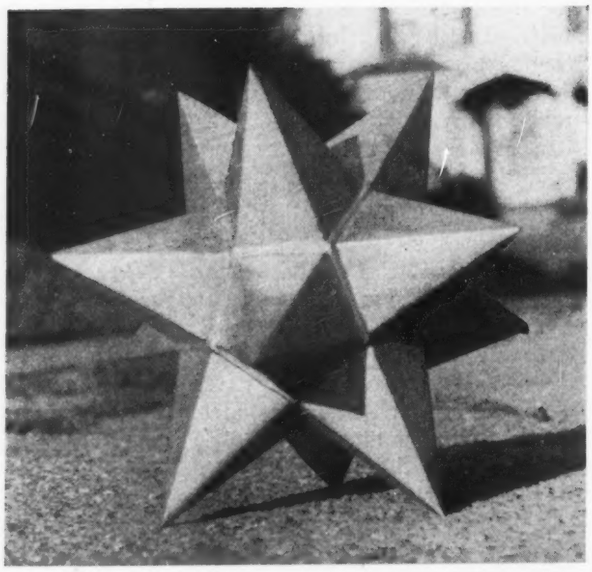
No less than 148 different styles are sold today. As each design is introduced its efficiency and relative smokiness is scientifically tested by county officials. In Los Angeles county, farm advisor M. B. Rounds places elaborate apparatus at the disposal of manufacturers and users alike. Mobile units test stoves at the grove too, under service conditions.

In condensed form, the requirements of a good orchard heater are as follows:

1. Hold sufficient fuel to burn all night without refueling.
2. Be capable of regulation to give greatest heat just before sunrise, even though fuel in reservoir is then low.
3. Be able to burn ordinary commercial fuels without leaving heavy residue or emitting more than 1 gram of "unconsumed solid carbonaceous matter" (smoke) per minute.
4. Be rain tight.
5. Deliver heat and products of combustion near the ground but without heating the ground unnecessarily.
6. Be easy to light and regulate by inexperienced labor under all weather conditions.
7. Be capable of being lighted with the draft opening set as required for normal burning.
8. Be readily extinguished by merely closing the regulator and capping the stack.
9. Be arranged for filling and for soot removal without taking off the stack or cover.
10. Be so designed that if it burns dry the bottom of the heater will not be damaged,

11. Avoid oil congestion on the stack or cover.
12. Be of reasonable cost.
13. Be made of good material and show small annual depreciation.
14. Be easy to take apart, clean and store.

A line, enjoying a wide sale, is distributed by the Scheu Products Co. of Los Angeles. Their HY-Lo job, for instance, is made of 24 gauge seamless bowl, galvanized by hot-dipped process. It is fitted with galvanized regulator and down draft tube of the same material. The stack is 30 inches high. Copper bearing metal is favored for orchard heaters generally. Galvanized, the finish both preserves the heater and seals the seams and joints.



Pattern For a Twelve Pointed Star

By L. F. Hyatt
Canton, Ohio

THE twelve-pointed star shown in Fig. A was submitted by an AMERICAN ARTISAN reader who wanted to use the star in window decorating.

First it is necessary to decide just what size the pentagonal faces of the dodecahedron (Fig. 2) are to be drawn.

To find the length of the side of a pentagon first draw the circle Fig. 1. Draw the horizontal center line *a-b* and the vertical center line *m-n*. Now with a radius equal to the radius of the circle *c-a* and with *a* as a center, strike an arc intersecting the circle at *d* and *e* and draw a straight line through the two points of intersection intersecting the horizontal center line at *g*. Now with *g* as a center and *g-m* as a radius, strike another arc intersecting the horizontal center line at *o*. A line drawn from *o* to *m* is the exact length of one side of the pentagonal face. Extreme care must be exercised in this work if the sides of the pentagon are correct.

To begin the pattern proper of the dodecahedron (Fig. 2) draw the circle (Fig. 3) using *a* as a center and a radius equal to that used in Fig. 1, and upon this circle step off the five sides as shown. Now with a radius equal to the radius of the circle just drawn and points 1-*2-3*, etc. of the pentagon just completed as centers, strike arcs allowing them to intersect as shown thus locating points *5-6-7-8-9*. With these points as centers draw circles and upon these circles step off the five sides as shown by *4-5*, *a*, *b-c*. Continue with all other pentagonal sides of the dodecahedron.

Now draw the plan of the pentagonal pyramid (Fig. 4) next with *x*-1 (which is the only true length line from the base to the apex) as a radius strike the arc *a-b* and upon this arc 1-*2-3-4-5*-1 found on the plan view. From each of these points on the arc *a-b* draw lines to the apex *x* and add the necessary lap seam.

It is important that the bending be carefully done and that all soldering be neatly done.

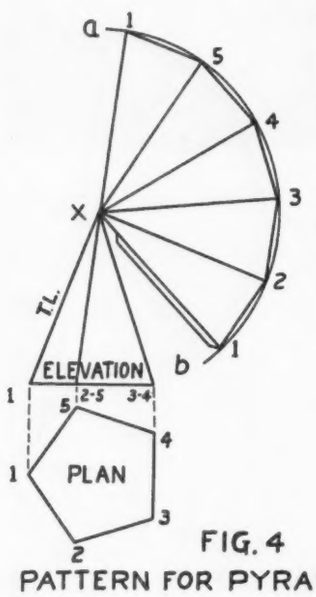


FIG. 4
PATTERN FOR PYRAMID

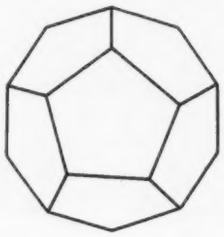


FIG. 2
DODECAHEDRON

FIG. 1
PENTAGON

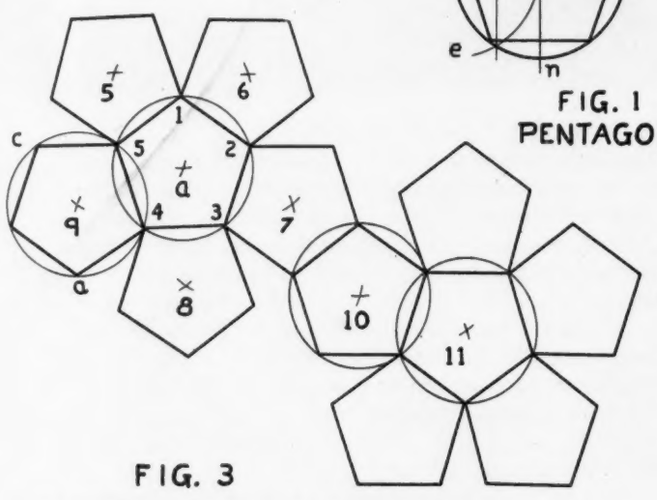


FIG. 3
PATTERN FOR DODECAHEDRON

VOTE

EVO

RESIDENTIAL AIR CONDITIONING SECTION

WHEN night air cooling was first suggested a few years ago, the originators pointed out that because outside temperatures dropped after sundown, cool night air circulated through a house in large volumes, accelerated the cooling of the materials of the structure and also provided cooling from direct air motion. Research showed that these two effects could be secured with air changes from 16 to 30 per hour.

However, interesting deviations have developed. As reported in April, and in this issue, the southwest has taken the idea and adapted it to direct air flow cooling using as high as 120 air changes per hour both in the daytime and at night. Others have used air flow cooling in conjunction with undersized refrigeration to obtain comfort at reduced expense.

This issue covers both these developments. The articles tend to show how a sound idea spreads and gathers value and how difficult it is to judge the merit of an idea until the industry has had time to play with it.

TAILOR-MADE SHEETS FOR SHEET METAL TAILORS

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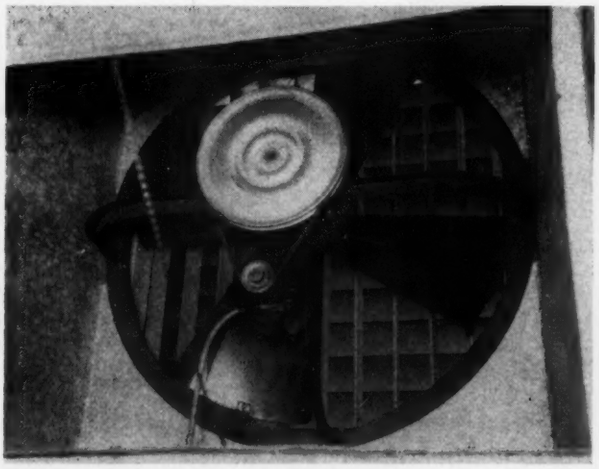
YOUNGSTOWN

A Combination Night Air Cooling-Warm Air Heating System



COMBINATION heating and cooling systems for residences, incorporating automatic firing, mechanical circulation, filtering, humidification, under automatic control in the winter cycle and cooling solely with an attic fan or an attic fan operating in conjunction with refrigeration, is looked upon by many as the next important step in our industry's march toward public comfort.

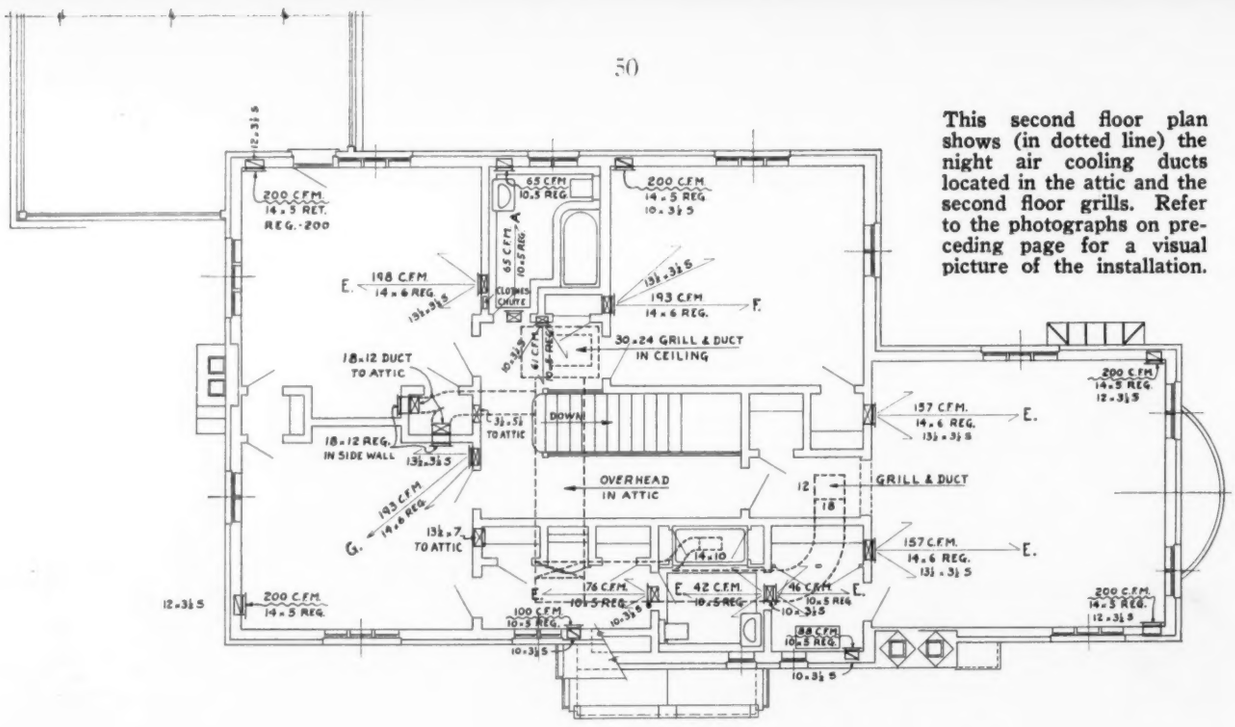
The underlying thought recognizes that in most parts of the country winter air conditioning is more important than summer cooling. Also, that home owners today will spend more money for winter comfort than for summer cooling. But . . . summer comfort is gaining in popularity and rightly engineered can be sold.

In the term "rightly engineered," many contractors profess to see the answer to the cooling cost problem. For example, the house reported in this article, located in Kansas City, Mo., is owned by a man who demanded the best possible winter air conditioning system. He also wanted cooling—if the initial and operating cost was not too high. Having no personal experience with cooling in residences and being unwilling to invest a large sum in apparatus without personal experience, this home owner welcomed contractor Arthur Hunt's suggestion that he provide some measure of cooling with an attic fan. Then if additional cooling was wanted, the attic fan would reduce initial cost and operating expense and was, therefore, a logical step in buying cooling.

The Cooling System

The attic fan ventilation system engineered for this house is simple, inexpensive and based upon experience. The large 42-inch propellor type fan is housed in a galvanized iron cabinet and the cabinet is connected to the outside with a chute equipped with gravity louvres. When the fan is running the louvres open to let the air out; when the fan is idle the louvres close to keep out wind and rain.

The back of the cabinet (as shown in a photograph) is a hinged door which moves to shut off the ducts to the fan and, at the same time, open the cabinet directly to the attic. This door is controlled by a chain which passes over pulleys to the second



SECOND FLOOR — HEATING

This second floor plan shows (in dotted line) the night air cooling ducts located in the attic and the second floor grills. Refer to the photographs on preceding page for a visual picture of the installation.

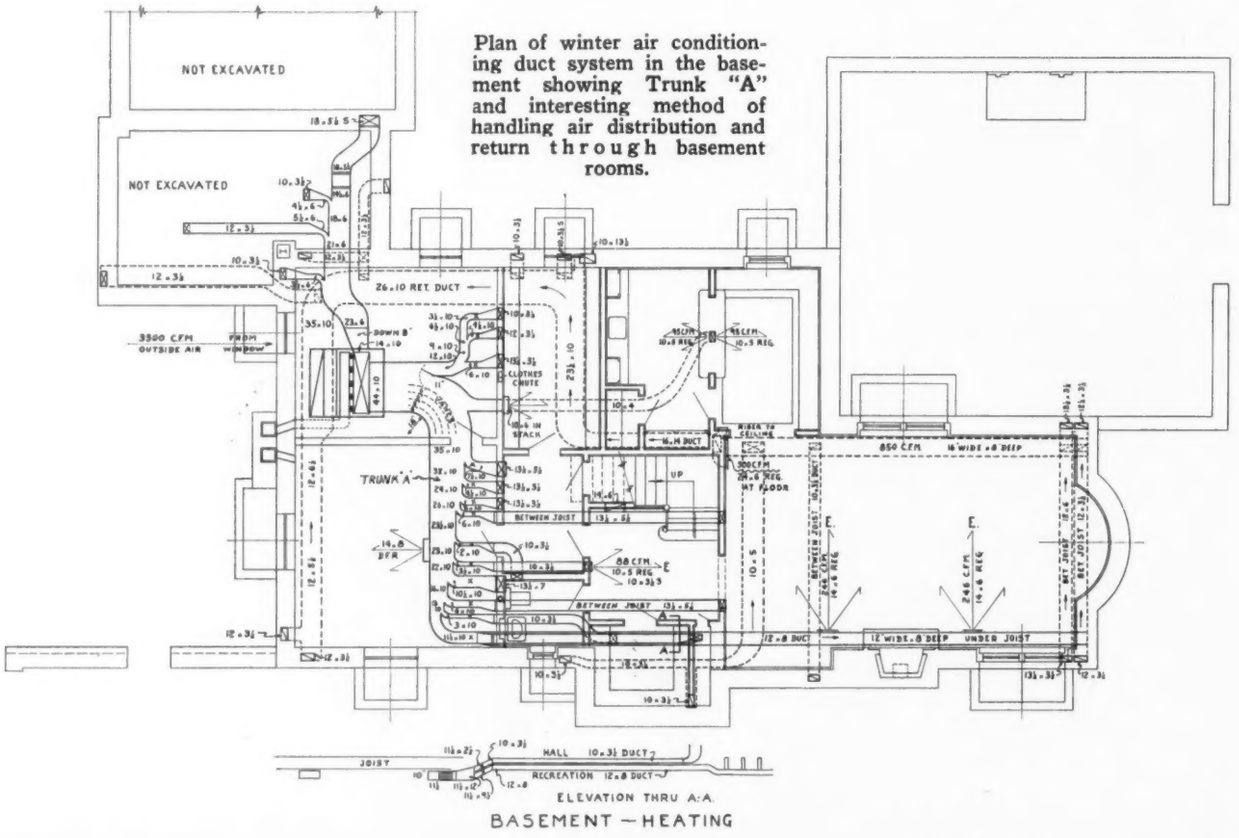
floor. Thus during the daytime the door can be opened and the attic ventilated. At night (or whenever second floor temperatures rise) the door can be closed and the air to the fan pulled from the second floor. At no time is it necessary to enter the attic.

The fan housing is connected directly by ducts to grilles in the second floor rooms. The locations are shown on the second floor plan. The largest grille is located in the hall, above the stairs. Smaller grilles open directly into bedrooms or just outside the doors. The system is completely piped and sized so that a balanced volume of air can be withdrawn from various sections of the house according to a prearranged plan.

Operating Results

Arthur Hunt of Hunt Brothers Co., in conjunction with the owner reports results from the cooling system as follows:

"It might appear to some that we were ventilating the second floor only, but we have found that by closing all second floor windows and opening the first floor windows, we ventilate the rooms in

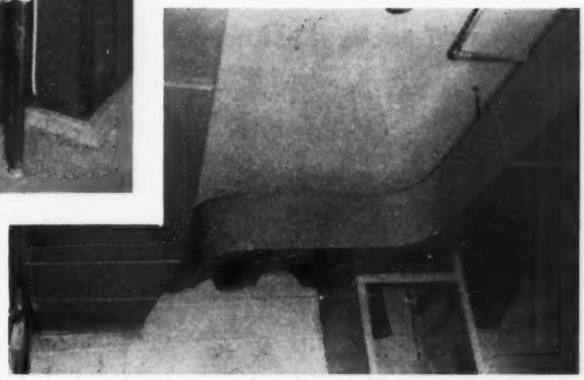


Plan of winter air conditioning duct system in the basement showing Trunk "A" and interesting method of handling air distribution and return through basement rooms.

BASEMENT — HEATING

The photograph directly below shows Trunk "A" with its many branches. Compare with the basement floor plan to see how closely installation followed Contractor Hunt's carefully made plan.

The winter air conditioning system consists of a gas fired, five section furnace with rear blower-filter housing. This system is not zoned, but careful sizing of ducts to resistance and balancing with the dampers shown in the pictures, made possible uniform temperatures throughout the house.



which the windows are opened, regardless of which floor. In fact, by opening the door to the basement and opening the basement windows only, we do a fine job in the basement.

"As the data sheet shows, we have 11,728 cubic content on the second floor. Our Breeze-air, Buffalo fan is rated at 10,000 cfm free delivery; by anemometer we are delivering approximately 8,200 cfm through ducts.

"Now, with the ability to move 8,200 cfm the 'trick' as it may be called, is to confine this 8,200 cfm to the exact area to be ventilated. Should the draft be too strong across the dining-room table with one window open, we can reduce that velocity by opening one or two windows in another part of the house. To bring down the temperature in the whole house at night, three or four windows may be opened on each floor.

"A large damper, controlled by a chain in a second-floor closet, governs the amount of air drawn out of the attic. As the damper moves away from the opening in the fan housing to permit the fan drawing air through the attic, it closes off the opening of the duct drawing the air through the first and second floor rooms.

"From our experience I should like to add: **Don't** install attic fans in unfinished attics and expect them to draw air from living quarters below. In other words, you can not put the attic under a vacuum, due to the leaky construction of the attic and roof.

"You can, however, set the fan within a housing in the attic and cut one large grille under this housing. In this way, the fan draws the air through the living quarters and discharges into the attic and out through windows or other leaky construction. This does not permit ventilating the attic only, during the hot afternoons when the outside air is too hot to be drawn through the living quarters of house.

"We have found that the only successful way to handle the air in a house with an unfinished attic, is to mount fan housing in a dormer so the fan will discharge directly to the outside and from the housing run one or more ducts to the ceiling registers or grilles. The area of the ducts must equal the face area of the fan you are using, unless you use a blower."

Winter Air Conditioning

The winter air conditioning system is a five section, gas fired, Fox furnace. The total heat loss of the house is 252,640 Btu at a temperature difference of minus ten to 70 degrees. Bathrooms, dressing rooms, the powder room are figured minus ten to 80 degrees; the attached garage minus ten to 40 degrees. The total cubic content of all heated areas is 36,696 feet.

One of the interesting features of this heating plant, is the warm air duct which carries air for the basement recreation room, first and second floor rooms across the front of the house. This duct was run along a partition wall with all but one branch turning up into the partition or extended between joists through the basement.

Also interesting is the large riser which passes up the partition between the southwest bedroom and bath to the attic and through insulated (see photographs) ducts supplies air for the southwest bath, master bath, master dressing room, master bedroom, southwest bedroom, south bath and second floor stair hall. All registers throughout the house are in the side wall, about 7 feet above the floor.

EDITOR'S Roundtable

Basement Recreation Rooms [Part 3]

A VERY interesting analysis of the problem of satisfactorily heating basement recreation rooms was received from G. A. Voorhees, consulting engineer, Indianapolis, Indiana. From many years experience Mr. Voorhees says:

"In designing forced air heating and winter air conditioning systems for those sections of the country where winters are long and continuously cold, I usually calculate heat losses of basement rooms on the basis of an 80-degree average room air temperature to compensate for the increased loss of heat from the bodies of the room occupants by radiation to the cold interior surfaces of outside basement walls.

"For plants in the central part of the country where winters are shorter, I usually base my calculations on a 70-degree room air temperature **but** if as much as half of the outside walls of the room are above grade, I figure the entire wall area as being above grade. This gives me a calculated heat loss which I find is sufficiently above the actual loss to make further correction unnecessary.

"Short periods of extremely cold weather do not chill the ground and basement walls below grade to nearly as great an extent as **long** periods of moderately cold weather. For example: the U. S. Weather Bureau shows the same minimum recorded temperature, 27 degrees below zero, for both Marquette, Michigan, and Parkersburg, West Virginia. But the cold will "penetrate" further down below grade level at Marquette than at Parkersburg because the **average** winter temperature is 27.6 degrees at Marquette and 41.9 degrees at Parkersburg. Sub-zero temperatures will hold for days at a time in the northern parts of the country, whereas they last for only a few hours in southern and central southern districts.

"Every heating contractor ought to familiarize himself with general climate conditions, rather than merely considering the lowest recorded temperatures in the territory in which he operates. In connection with this problem of ground temperature and its effect on transmission heat losses of rooms below grade, for example, the prevalence of snow has considerable effect. In those localities where heavy snowfall may be expected early in the winter and the ground remains covered with snow throughout most of the heating season, the cold does not penetrate as deeply below grade as in other localities having about the same outside air temperatures with relatively little snow. This "insulating effect" of snow was brought to my attention by the Weather Bureau and the U. S. Geological Survey a couple of years ago when I was investigating ground temperatures to figure heat losses of rooms partly or wholly below grade.

"The Geological Survey suggested further that any heating contractor could probably obtain reliable data on ground temperatures in his particular community by contacting the Department of Soil Physics of his State University or the nearest Agricultural Experiment Station.

"I find that, unless definite precautions are taken to prevent it, there will be a greater difference between ceiling, breathing level and floor temperatures in a basement room than in a room on the first or second floor. Particular attention should be given to this if a basement is fitted up as a play room for the younger children who will always be

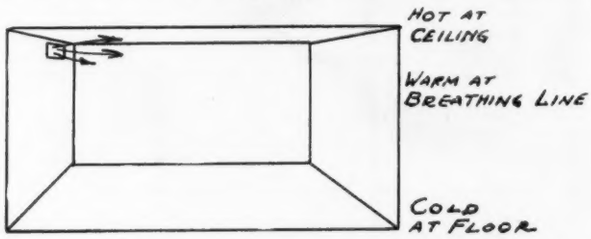


Fig. 1—Showing low velocity register and comfort result in room.

occupying a zone within two or three feet of the floor. To an adult standing, this condition may pass unnoticed. To an adult seated at rest it may result in slight discomfort. But to a child playing on the floor, it's a real health hazard.

"Too often a conventional gravity type warm air supply register is placed in the wall just below the ceiling and no specific provision is made for withdrawal of cold air. Then we find a condition like that shown in Fig. 1. An open fireplace withdrawing cold air from the lower levels of the room will help somewhat to decrease the temperature difference between floor and ceiling. It is unfortunate that even when the heating contractor makes a reasonable estimate of the heat requirement of such a room, he is still inclined to "guess that such and such a size register will be about right" and let it go at that.

"If, with an installation as shown in Fig. 1, the register is made smaller and the air discharged at a higher velocity, the turbulence thus produced will help to mix the incoming warm air with the cooler room air and **help** to secure a more uniform room air temperature.

"A deflecting type of forced air register which will discharge the air downward at a velocity of perhaps 500 feet per minute as shown in Fig. 2, helps still more to raise the temperature of the room air in the lower levels and is to be preferred. The register should be so located that there will not be annoying air currents in those parts of the room where occupants are likely to be seated or otherwise inactive.

"With either type of warm air supply register, the heating results are better if a return air grille is installed to withdraw cold air from the floor line and return it directly to the heating or air conditioning unit.

"My own experience has been that the best results are secured when both the warm air supply and cold air return grilles are placed at or near the floor. (Fig. 3.) And the reason apparently is this:

"There are two ways to get rid of an accumulation of cool or cold air in the lower levels of any room. One is to take that cold air OUT of the room. The return air grille

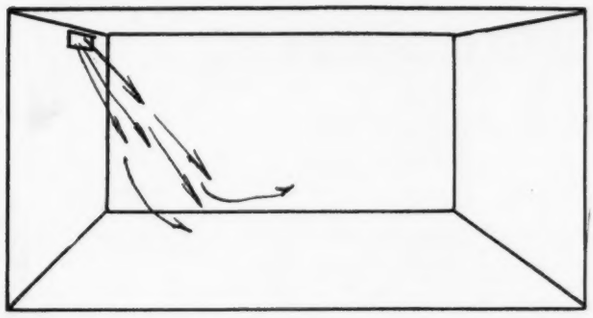


Fig. 2—Showing effect of high velocity, downward deflecting type register.

at the floor line does this. The other way is to MIX that stratum of cold air with warmer air and the warm air supply outlet placed near the floor accomplishes this.

"The supply register near the floor raises the temperature of room air in the lower room level in two ways. It

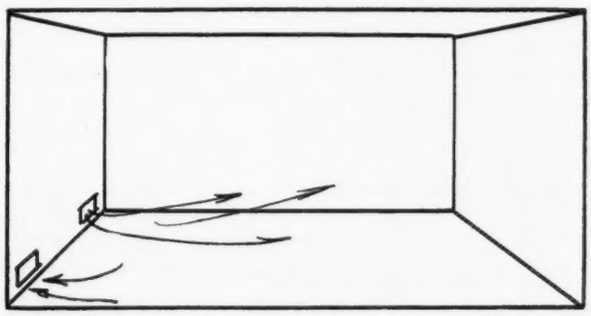


Fig. 3—Warm air introduced near floor and return on same wall will mix room air and make floors warm.

introduces heated air from the furnace directly into the "cold air stratum" where it mixes with and raises the temperature of the cool air. It creates an **induced** flow of warmer room air from above which also helps materially to break up the "pocket" of cold air and thus equalize room air temperatures. (Fig. 4.)

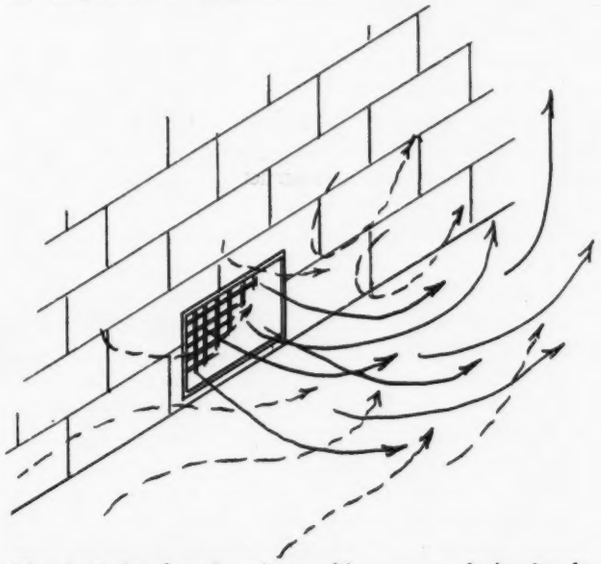


Fig. 4—A baseboard register with proper velocity breaks up cold stratum at floor and induces room air mixture.

Arthur W. Hunt, Kansas City, Mo.

American Artisan:

After reading the articles on "Basement Room Heating" under the headline of the Editors Roundtable, it seems no wonder some firms have had trouble making the basement rooms comfortable, as there appears to be too much of the old gravity method of guessing the requirements and then adding 10%, 25% or 50% plus a strong "I Hope, I Hope, I Hope" that all works O. K. when it gets colder weather.

When we put gutter on a house, we "measure" exactly how long the gutter should be and proceed to section together that exact amount of gutter. Of course we are not surprised when the gutter fits the place, exactly.

Every one agrees that the basement rooms are a new problem added to our industry some eight years ago. We all also agree, I believe, that we can do a good job in basement rooms by the use of zone controls. However, the greater number of jobs will not stand the cost of zone controls, so the rooms must be treated without the aid of zones.

If we should be requested to write the specifications on large recreation rooms, we would ask for furred side walls with 2-inch rock wool insulation, regardless of how much wall was under ground. We would ask that the cement floor be poured on 4-inch hollow tile, or a furred oak floor laid over the cement floor. Of course for a 100% job we would call for a thermostat and zone control.

Our larger homes seem to have adopted the plan of large recreation rooms in the basements with three walls exposed. The living-room will be the same size on the first floor and of the same size we find the master bed-room on the second floor. All three rooms have three walls exposed and demand consideration of all conditions to obtain perfect results.

Our data sheet on the basement room of standard construction and no insulation, would call for the following:

The glass area would be treated the same as on upper floors—1.13 x sq. ft. x 80 degrees.

The uninsulated foundation walls would be (coefficient as in A. S. H. & V. E. guide) for such walls x sq. ft. x 80 degrees—treated as if all was above ground.

The infiltration would be cubic content x 2 x .02 x 80 degrees.

The uncovered 4-inch cement floor is where some may go wrong.

We use sq. ft. of floor x 1.07 x 40 degrees.

We do not consider the plastered ceiling under heated living room.

We greatly advocate lots of air movement and a resulting lower plenum temperature which in turn lowers our register temperature.

As we know at this point the Btu requirements for the recreation room, we locate the registers—always two and sometimes three and four supply registers to do a good job.

The distance from the registers to the plenum is measured and ¼ of a degree heat loss is calculated for each foot of duct along the basement ceiling and this gives us the register temperature, which we must *know* in order to get the correct amount of C.F.M. at registers.

We have, in the past six years, installed plants in homes with heat loss of from 200,000 to 315,000 Btu both oil and gas fired and all have large recreation rooms; some have a bar room, man's room, bath and shower, laundry and ping-pong room. And we are having no trouble.

We start our blowers at 130 degree plenum temperature and circulate a large quantity of air at a low register temperature. This means our blower runs much longer per hour than if all air is handled at higher temperatures.

One writer mentioned he had trouble with the bath rooms. I would like to comment on that problem a little also.

Thirty years ago, we thought it necessary to bring all our cold air in from out of doors, if we wanted to live in a house heated by a hot air furnace. We laugh at that today because we know better.

To heat a bath room with forced warm air to an 80-degree temperature demands a return air grille and a four sided metal duct back to the blower, to do a perfect job. We have installed returns from all bath and dressing rooms and treat these rooms exactly as we do the living or dining rooms on all of our installations, the past three years.

Odor, you say? There is none. It is like air from out of doors—try it once.

We use four sided metal ducts and elbows, all air tight, on all our return air to unit.

Precalculated Engineering

So far in this series the author has shown how Precalculated Tables can be used to established heat loss through walls and by infiltration. He has used a window 2½ feet wide by 5 feet high. In this article he provides a correcting table (Table 9) to be used when windows are larger than standard. Readers will also find Table 2 for walls having a coefficient approximately 0.20.

By G. A. Voorhees
Consulting Engineer,
Indianapolis, Ind.

THE tables with explanations and comments, which are being presented in this series of articles, are given with three objectives in view:

1. To show that precalculated tables can be used:
   (a) to give results which, for practical purposes, are accurate—results approaching the accuracy attained through lengthy and precise calculations;
   (b) to save time—to give these *practically* accurate results at the cost of only a little more time than is needed to apply crude, "thumb rules".
2. To provide a series of such precalculated tables which may be put to immediate use if the reader considers them suited to his needs.
3. To give enough information about the methods used in calculating the tables, so that any reader can compile similar tables which may more nearly fit his own requirements.

Since the first article of the series appeared in the January issue, many helpful suggestions and constructive criticisms have been received from heating contractors, engineers and salesmen. Two typical comments having a direct bearing on the subjects covered in the present installment, are these:

"I have tried these tables on several jobs and like the principle better than anything I have found yet for getting accurate results quickly, but for our locality I can't agree that a width of 2½ feet and height of 5 feet is a fair average of window size. That size might be all right somewhere else, but it doesn't hold good here."

"Why does everybody always take for granted that furnace jobs are figured for zero weather? There is not a good heating man around here who would figure on a higher outside temperature than 10 below zero and in the north part of the state they will figure on 20 or 25 below. My partner and I both think the tables are fine for the fellows who happen to be where it is O. K. to figure on a difference of 70 degrees between inside and outside, but we can't do that here so the tables don't do us any good".

Regarding the first criticism, the assumption of 2-ft. 6-ins. by 5-ft. as "standard" window size was believed to represent a reasonable average of window dimensions found in dwellings in most sections of the country. There are two ways of handling windows of other dimensions.

First: In localities where the above assumed dimensions do represent a fair average, the tables can be used as they are for *most* of the windows and a correction factor applied to other sizes.

Second: In localities where the average window size is different, new tables can be easily calculated to meet the specific needs.

In the first case the correction factor mentioned, is a number which shows how many "standard" (2½-ft. by 5-ft.) windows will produce the same loss of heat from a room as one window of any other dimensions. Such factors are given in the accompanying Table 9.

The practical application of this table is shown by the following example:

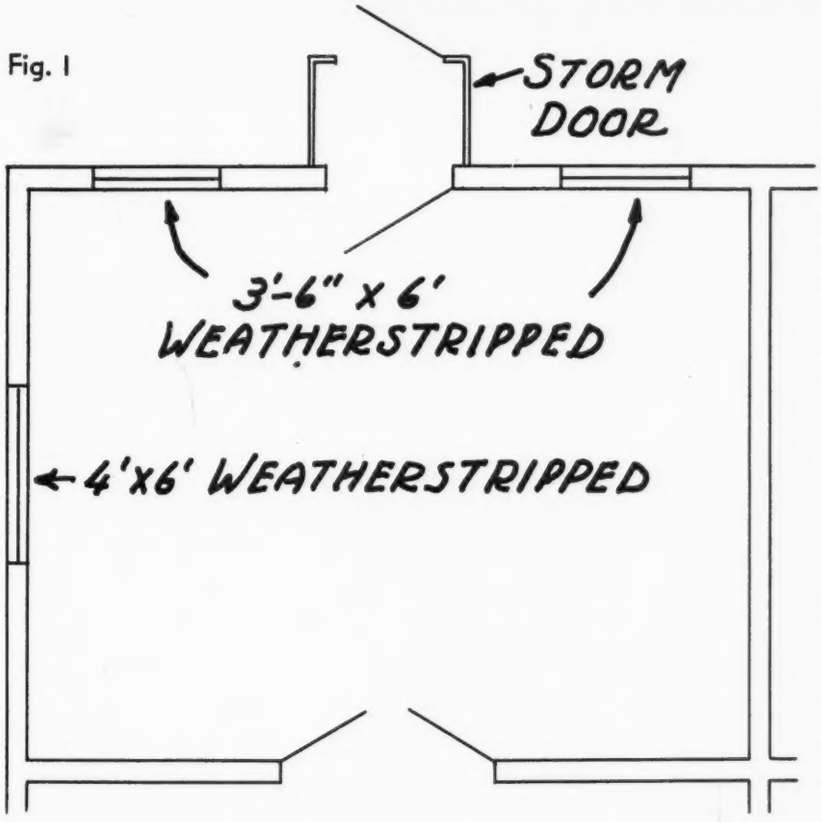
Assume that a room (Fig. 1) is 13 feet by 17 feet with ceiling height of 9-ft. 6-ins. Frame construction; outside finish, asbestos shingles on furring strips on wood sheathing; inside finish, ½-in. plaster on ½-in. fiber board plaster base (construction No. 11 in accompanying Table 2). Cold ceiling with tight floor above. No cold floor. One outside door protected by well fitted storm door, but not weatherstripped. Two double hung windows 3-ft. 6-ins. by 6-ft., one double hung window 4-ft. by 6-ft.; all windows weatherstripped, but not protected by storm sash.

Table 2 shows that the heat loss through the gross area of 30 running feet of such wall is 3.8 *if the ceiling height is* 9 *feet, and* 4.2 *if ten feet.* Since the room has a 9½-ft. ceiling, the heat loss through the gross wall will be the mean between 3.8 and 4.2 which is 4.0 (meaning 4,000 Btu. per hour).

The designation "W" under the head of Window Type on the data sheet indicates weatherstripped window. The designation "S" for the outside door indicates that it is protected by a storm door.

Table 9 shows that one window 3½-ft. wide by 6-ft. high is equivalent in heat loss to 1.5 windows of the same type and of the standard 2½-ft. by 5-ft. size covered by the tables. Since there are two 3½-ft. by

Fig. 1



Room		Dimensions 13X17		
Construction of exposed wall		#11		
Table No. 2		Ceiling height 9½		Heat loss
Running feet exposed wall		30		4.0
WINDOWS Type	Dimensions	No.	Equiv. No. of standard windows	
W	3½x6	2	3	
W	4x6	1	1.7	
			~~4.7~~ 5	7.9
Outside doors	Type S	1	2	3.1
Cold ceiling	Floor above	Dimensions 13 X17		3.1
Cold floor	none			
Heat loss for 70-degree temperature difference				18.1
Corresponding heat loss for Temp. Diff. of degrees				

6-ft. windows, they are equivalent in heat loss to 2 × 1.5 = 3 standard windows and so entered on the data sheet.

There is one 4-ft. by 6-ft. window which Table 9 shows to be equivalent to 1.7 standard windows.

The data sheet shows therefore, that the room has a total of 3 + 1.7 = 4.7 equivalent windows. Table 2 shows that the heat loss through four standard size weatherstripped windows is 6.3 and through five such windows it is 7.9 which brings us to the question: "Just *how* accurately do we want to estimate the window heat loss?"

We can call it five windows and enter the loss at 7.9 as has been done on the data sheet, or we can find a more accurate value by interpolation as follows:

The heat loss through 4.7 windows is equal to the loss through four windows plus the loss through seven-tenths of a window. Since the loss through one standard weatherstripped window is shown by the table to be 1.6, the loss through seven-tenths of a window will be 0.7 × 1.6 = 1.1 and the loss through 4.7 windows will therefore be:

Heat loss through 4 windows	6.3
Heat loss through seven-tenths of a window	1.1
Heat loss through 4.7 windows by addition	7.4

To assume five windows giving a heat loss of 7,900 Btu. per hour instead of interpolating to get the more accurate value of 7,400 Btu. per hour for 4.7 windows, results in an "error" of 500 Btu. per hour in the win-

TABLE 9

Number of double hung windows 2-ft. 6-ins. wide by 5-ft. high producing total transmission and infiltration heat loss equivalent to that of one window of dimensions shown.

Height of Opening Feet	Width of opening, feet								
	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"
2'-0"	0.3	0.4	0.5	0.5	0.6	0.7	0.8	0.9	1.0
2'-6"	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1
3'-0"	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2
3'-6"	0.4	0.6	0.7	0.8	0.9	1.0	1.1	1.3	1.4
4'-0"	0.5	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5
4'-6"	0.5	0.7	0.8	1.0	1.1	1.2	1.4	1.5	1.6
5'-0"	0.6	0.7	0.9	1.0	1.2	1.3	1.5	1.6	1.8
5'-6"	0.6	0.8	1.0	1.1	1.3	1.4	1.6	1.7	1.9
6'-0"	0.7	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0
6'-6"	0.7	0.9	1.1	1.3	1.5	1.6	1.8	2.0	2.2
7'-0"	0.8	1.0	1.2	1.4	1.5	1.7	1.9	2.1	2.3
7'-6"	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4
8'-0"	0.9	1.1	1.3	1.5	1.7	1.9	2.1	2.4	2.6

Table 2 [Heat Transmission Coefficient—0.20]

Heat Loss Through Gross Exposed Wall (Temp. Diff. 70 Deg.)

Running feet exposed wall	Ceiling height, feet 8	9	10	Running feet exposed wall	Ceiling height, feet 8	9	10
4	0.4	0.5	0.6	37	4.1	4.7	5.2
5	0.6	0.6	0.7	38	4.3	4.8	5.3
6	0.7	0.8	0.8	39	4.4	4.9	5.5
7	0.8	0.9	1.0	40	4.5	5.0	5.6
8	0.9	1.0	1.1	41	4.6	5.2	5.7
9	1.0	1.1	1.3	42	4.7	5.3	5.9
10	1.1	1.3	1.4	43	4.8	5.4	6.0
11	1.2	1.4	1.5	44	4.9	5.5	6.2
12	1.3	1.5	1.7	45	5.0	5.7	6.3
13	1.5	1.6	1.8	46	5.2	5.8	6.4
14	1.6	1.8	2.0	47	5.3	5.9	6.6
15	1.7	1.9	2.1	48	5.4	6.0	6.7
16	1.8	2.0	2.2	49	5.5	6.2	6.9
17	1.9	2.1	2.4	50	5.6	6.3	7.0
18	2.0	2.3	2.5	51	5.7	6.4	7.1
19	2.1	2.4	2.7	52	5.8	6.6	7.3
20	2.2	2.5	2.8	53	5.9	6.7	7.4
21	2.4	2.6	2.9	54	6.0	6.8	7.6
22	2.5	2.8	3.1	55	6.2	6.9	7.7
23	2.6	2.9	3.2	56	6.3	7.1	7.8
24	2.7	3.0	3.4	57	6.4	7.2	8.0
25	2.8	3.2	3.5	58	6.5	7.3	8.1
26	2.9	3.3	3.6	59	6.6	7.4	8.3
27	3.0	3.4	3.8	60	6.7	7.6	8.4
28	3.1	3.5	3.9	61	6.8	7.7	8.5
29	3.2	3.7	4.1	62	6.9	7.8	8.7
30	3.4	3.8	4.2	63	7.1	7.9	8.8
31	3.5	3.9	4.3	64	7.2	8.1	9.0
32	3.6	4.0	4.5	65	7.3	8.2	9.1
33	3.7	4.2	4.6	66	7.4	8.3	9.2
34	3.8	4.3	4.8	67	7.5	8.4	9.4
35	3.9	4.4	4.9	68	7.6	8.6	9.5
36	4.0	4.5	5.0	69	7.7	8.7	9.7
				70	7.8	8.8	9.8
				71	8.0	8.9	9.9
				72	8.1	9.1	10.1

Add For Windows

Type	Number of equivalent windows 1	2	3	4	5	6	7	8	9	10
Plain—no weatherstrip, no storm sash	1.9	3.8	5.6	7.5	9.4	11.3	13.1	15.0	16.9	18.8
Weatherstrip only—no storm sash	1.6	3.2	4.7	6.3	7.9	9.5	11.0	12.6	14.2	15.8
Storm sash only, no weatherstrip	1.5	3.1	4.6	6.1	7.6	9.2	10.7	12.2	13.7	15.3
Both weatherstrip and storm sash	1.2	2.5	3.7	4.9	6.1	7.4	8.6	9.8	11.0	12.3

Wall Types to Which This Table Applies

No.	Type of Wall	Outside Finish	Inside Finish	Trans. Coef.
2	Frame	Clapboards or wood shingles on wood sheathing	½-in. plaster on ½-in. fibre board plaster base	0.19
4	Frame	Clapboards or wood shingles on ½-in. fibre board sheathing	½-in. plaster on ½-in. fibre board plaster base	0.18
6	Frame	Wood shingles on furring strips on ½-in. fibre board sheathing	Lath & Plaster	0.19
7	Frame	Wood shingles on furring strips on ½-in. fibre board sheathing	½-in. plaster on ½-in. fibre board plaster base	0.15
11	Frame	Asphalt or asbestos shingles on furring strips on wood sheathing	½-in. plaster on ½-in. fibre board plaster base	0.19
13	Frame	Asphalt or asbestos shingles on furring strips on ½-in. fibre board sheathing	½-in. plaster on ½-in. fibre board plaster base	0.17
15	Frame	Stucco on wood sheathing	½-in. plaster on ½-in. fibre board plaster base	0.22
17	Frame	Stucco on ½-in. fibre board sheathing	½-in. plaster on ½-in. fibre board plaster base	0.20
19	Frame	Brick veneer on wood or ½-in. fibre board sheathing	½-in. plaster on ½-in. fibre board plaster base	0.20
23	Brick	8-in. solid brick wall	½-in. plaster on ½-in. fibre board plaster base, furred	0.22
26	Brick	12-in. solid brick wall	½-in. plaster on ½-in. fibre board plaster base, furred	0.19
29	6-in. Hollow Tile	Brick veneer	½-in. plaster on ½-in. fibre board plaster base, furred	0.19
35	8-in. Concrete Block	Brick veneer	½-in. plaster on ½-in. fibre board plaster base, furred	0.21
38	8-in. Cinder Block	Stucco	½-in. plaster on ½-in. fibre board plaster base, furred	0.20
41	8-in. Cinder Block	Brick veneer	½-in. plaster on ½-in. fibre board plaster base, furred	0.18
44	8-in. Haydite Block	Stucco	½-in. plaster on ½-in. fibre board plaster base, furred	0.19
47	8-in. Haydite Block	Brick veneer	½-in. plaster on ½-in. fibre board plaster base, furred	0.17

dow loss. This amounts to 6.75 per cent in the heat loss due to the windows but, as will be shown later, it is a much smaller percentage of the total heat loss of the room and it's a question whether the average designer is justified in interpolating for the sake of the slight increase in accuracy.

Counting one outside door as equivalent to two windows and assuming that a well fitted storm door affords about the same degree of protection to a door as storm sash does to a window, the one outside door in this room is equivalent to two windows with storm sash for which Table 2 shows an additional heat loss of 3.1.

Table 8 (Feb. 1938, page 49) shows that the heat loss through a cold ceiling, 13-ft. by 17-ft. with tight floor above, is 3.1.

The total heat loss of the room as shown by the data sheet, is 18,100 Btu. per hour—assuming that the window loss is 7,900 Btu. But if we take 7,400 Btu. which was obtained above by interpolation, as being the "correct" loss for the windows, then the total heat loss of the room would be 17,600 Btu. and the final error resulting from using five instead of 4.7 windows, amounts to:

$$\frac{18{,}100 - 17{,}600}{17{,}600} \times 100\% = 2.8 \text{ per cent.}$$

The type of the theorist who is everlastingly tied to a text book might insist on the more precise method to avoid an error of 2.8 per cent. But let's see just how much 2.8 per cent amounts to. In laying out a gravity plant according to the Standard Gravity Code, the "approximate" loss of 18,100 Btu. per hour would require $9 \times 18.1 = 162.9$ square inches of leader area while the "accurate" loss of 17,600 would require $9 \times 17.6 = 158.4$ square inches of leader—not enough difference to affect the size of pipe (14-in.) or pipes (two 10-in.) that would actually be installed.

In designing a mechanical system, if the "accurate" method called for a blower having a capacity of 1300 cubic feet of air per minute, the "approximate" method would require a capacity 2.8 per cent more, or 1336 cfm—not enough difference to change the size of the blower. So why split hairs?

Derivation of Table 9

The foregoing explanations have shown *how* to use Table 9. The next several paragraphs tell *why* the factors in that table give the required corrections for various sizes of windows and they will probably be of interest to only those readers who want to know in detail, the foundation on which a table is built before they adopt it for their own use.

Let .....
- w = width of window opening in feet
- h = height of window opening in feet
- T = rate of transmission loss, Btu per square foot of window area per hour for a 70-deg. inside-outside temperature difference
- L = rate of leakage heat loss, Btu per running foot of crack per hour for a 70-deg. inside-outside temperature difference
- $w \times h$ = area of window, square feet
- $(3 \times w) + (2 \times h)$ = crackage of window, running feet
- $w \times h \times T$ = transmission heat loss of window, Btu per hour
- $[(3 \times w) + (2 \times h)] \times L$ = leakage heat loss of window, Btu per hour

Since the total heat loss through any window is the sum of the transmission and leakage losses, this total for a window of any dimensions is represented by the expression:

$$(w \times h \times T) + (3 \times w \times L) + (2 \times h \times L)$$

As explained in Part I (January issue) the tables of heat losses due to windows were based on two different rates of transmission (T) and two rates of leakage loss (L):

Transmission:
- Plain window.....79 Btu. per hr. per sq. ft.
- Window with storm sash..52.5 Btu. per hr. per sq. ft.

Leakage:
- Non-weatherstripped window .....60 Btu. per hr. per ft. crack
- Weatherstripped window .....34.1 Btu. per hr. per ft. crack

From the standpoint of strict technical accuracy, there should be four sets of Table 9 factors; one for windows having neither weatherstrip nor storm sash; one for windows with weatherstrip only; one for windows with storm sash only; one for windows with both strip and sash. But the use of four such tables of factors instead of one, introduces a degree of precision which is not warranted by the very slight difference in practical results. In the sizes of windows most commonly found in dwellings, such precise calculations will make a difference in the accompanying Table 9 factors less than plus or minus 0.1 which is not worth taking into account.

The values in Table 9 were obtained by substituting in the above expression, the average values for T and L. The average value of T is ½ of $(79 + 52.5)$ which is 66 and of L is ½ of $(60 + 34.1)$ which is 47.

Then the *average* heat loss for a given window of any type and dimensions =

$$(w \times h \times 66) + (3 \times w \times 47) + (2 \times h \times 47)$$

$$= (66 \times w \times h) + (141 \times w) + (94 \times h)$$

For the assumed standard dimensions (2.5-ft. by 5-ft.) used in compiling the tables, this becomes:

(*Continued on page* 98)

An Inventory of Attic Ventilation in Southwest Cities —San Antonio—

IN the April issue we reported the campaign to sell attic ventilation or "Air Flow Cooling" conducted in Dallas, Texas. Of interest and nearly as comprehensive has been the campaign staged in San Antonio where, as in Dallas, the San Antonio Public Service Company and affiliated contractors have been the spearhead of the drive. The literature used in San Antonio was not specially prepared—as the illustrations show the campaign was based upon literature furnished by fan manufacturers and imprinted with contractors' names.

But—When you stop you SWELTER!

When summer's fiery heat clamps down on your home you will probably suggest an automobile ride to get cool. Get in your car and take such a ride. The air you drive through may be just as hot as the air in your home but while riding you will feel cool and comfortable. The cooling sensation you enjoy is due to the evaporation of body moisture and the absorption of body heat brought about by the constant changing of air and the rapid motion of the car.

COOLAIR Ventilating and Cooling systems utilize this same principle of air in motion in their method of operation. The difference is that the cooling effect of the automobile ride is completely reversed—instead of moving through the air as you do in a car you remain in your home and the COOLAIR Ventilating and Cooling System draws cool, fresh, invigorating air through the rooms and forces hot, stagnant air to the outside through openings in the attic.

The COOLAIR Ventilating and Cooling System for home cooling consists of a large, quiet, economical COOLAIR fan installed in the attic. The fan is connected to a grille in the ceiling of the hall by a duct and with the simple snap of a switch it begins to quietly pull great volumes of cool, fresh air through all open doors and windows. As the air is drawn through the rooms it is pulled through the grille and exhausted into the attic; forcing hot, stagnant air to the outside through louvers and other openings.

There is a COOLAIR Ventilating and Cooling System for every home; cottages, bungalows, double-houses, mansions, row-houses and apartments . . . and within the means of the most moderate budget. For less than the cost of a summer vacation trip your whole family can enjoy the benefits of a COOLAIR Ventilating and Cooling System all summer long—and for many summers to come. Make up your mind now to rid your home of long hot summer nights and the sweltering heat of days by this simple and inexpensive installation. There is a size and type of COOLAIR Ventilation and Cooling System to meet your particular requirements. The American COOLAIR Corporation has pioneered the home cooling field for more than nine years and you can rely on all COOLAIR Ventilating and Cooling Systems. Let our experienced Engineering Department advise you on your ventilating and cooling problems.

Second page of a four-page leaflet furnished by American Coolair Corp. On page one the leaflet points out that a ride in the car is one means of cooling off but— and page two carries on as shown.

How a COOLAIR System will Solve Your Home Ventilating and Cooling Problems

COOLAIR Ventilating and Cooling Systems are the real solution to efficient, low cost home ventilating and cooling problems. They utilize Nature's plan of cooling through air motion, evaporation and absorption of stored up heat. There are a number of ways of installing the COOLAIR Ventilating and Cooling System in a home, but the method illustrated above has proved to be the most efficient and easy to apply. The illustration shows a COOLAIR fan connected directly to a grille located in the ceiling of the hallway.

This arrangement insures perfect circulation and gentle breezes as the air handled by the fan is pulled through the grille from the rooms below and discharged into the attic where it forces the accumulation of hot, stagnant air outside through louvers and other openings. This is a typical installation but regardless of the size or type of home, whether one or two story, or whether it has a high or low attic, or no attic at all, there is a COOLAIR Ventilating and Cooling System designed for your home.

The COOLAIR Ventilating and Cooling System blower cooling fan is shown at the left with patented installation features, covered by United States patent number 1,992,112. Note the spring suspension feature, which eliminates all vibration, and other distinctive COOLAIR characteristics.

Reduces the Temperature of Every Room

When the torrid sun beats mercilessly on the roof of your home, the attic space, filled with dead, motionless air, absorbs the sun's heat and slowly radiates it through the walls and ceiling to the rooms below. This hot air makes the entire home almost unbearable during summer and the purpose of all COOLAIR Ventilating and Cooling Systems is to quietly and quickly correct this condition. With a COOLAIR Ventilating and Cooling System in the waste attic space, cool, fresh air is drawn into the home and as the air is forced through the attic to the outside it absorbs the stored up heat in the walls, roof and ceiling, and at once creates a gentle breeze, with its cooling sensation, throughout the entire home.

Page three of the same Coolair leaflet showing how an attic ventilation system is installed and what the fan looks like.

In San Antonio, Texas, attic ventilation has been actively pushed by a very few concerns for three or four years. In 1936 the San Antonio Public Service Company added its support by supplying names of customers and a mailing service. Also, in the downtown display room, space was given to dealers where their type of fan might be shown with a salesman in attendance. The service company did not employ any canvassers or salesmen, but did supply an engineer assigned the task of making free surveys of commercial or residential prospects and, further, a checking service on any plans submitted by the contractors.

The engineers of the service company and contractors worked out general recommendations for the needs of the area. In San Antonio, days are extremely hot, but most nights are cooled by breezes from the gulf so the particular requirement was a system and a fan of such size that a cooling volume of air could be circulated throughout the house during the daytime. Sixty air changes per hour were decided upon as a minimum, with larger volume if possible.

Further, most houses have no basements and are not too well constructed, from a heat insulating standpoint. A typical house would heat up rapidly and cool off rapidly and if attic temperatures could be kept down, comfort was reasonably certain. The general type of installation suggested consisted of one large grille in the attic floor with the fan in its tight housing directly above. Since few houses have dormer windows a system of cutting openings along the eaves was worked out to provide exhaust openings for the air pressure built up in the attic.

Imprinted leaflet supplied by Buffalo Forge Co. telling how night air cooling functions, what the equipment will do and on pages not shown just how a residence ventilation system brings relief from high temperatures.

Below—Page from an elaborate American Blower Company booklet on night air cooling. Contractors handling this make of fan had names imprinted on the back page.

◆

The "BREEZ-AIR" Is Engineered Especially for Home Ventilation
THE 30" fan capacity is sufficient to give an air change once very two and one-half minutes in the average home which gives 24 air changes per hour. This means that you should be able to cool down the residence after sunset by 80% of the difference between outside and inside temperatures.
The illustration above shows the usual method of installing the Buffalo "Breez-Air" Fan. Grills and suction inlet boxes are employed. Air is discharged into the attic, suitable openings being provided so it can pass outside.
Four Sizes Available
"BREEZ-AIR" Fans are stocked in four sizes —30", 36", 42" and 48". These may be installed with mounting boxes in either of two types. This box is usually made locally of wood, satisfactory as steel and generally more economical. However, steel mounting boxes are stocked.
The 30" fan is recommended for the average home, the 36" size for larger buildings. For business places, dance halls, or other structures, which permit cooling thru the attic or overhead rooms, the 42" and 48" sizes are recommended.
"Breez-Air" For Summer Comfort
When the heat is almost unbearable this Summer, you will enjoy the comfort and refreshing coolness of a "Breez-Aired" home.
Full price information contained in Sheet No. 3019, which will be sent upon request.
Enjoy - - -
COOL COMFORT
IN HOT WEATHER
HEATING & AIR CONDITIONING
GAS & ELECTRIC APPLIANCES
GARFIELD 0188
657 MAIN AVE

These eave slots were screened to keep out birds. Sizes of slots were determined on the basis of a 700-foot velocity through the opening.

The cooperating contractors secured from their fan manufacturer suitable literature explaining the system. These leaflets were stamped with the dealers name and given to the Public Service Company. All leaflets were then put into one mailing envelope and the literature sent to a selected list of names.

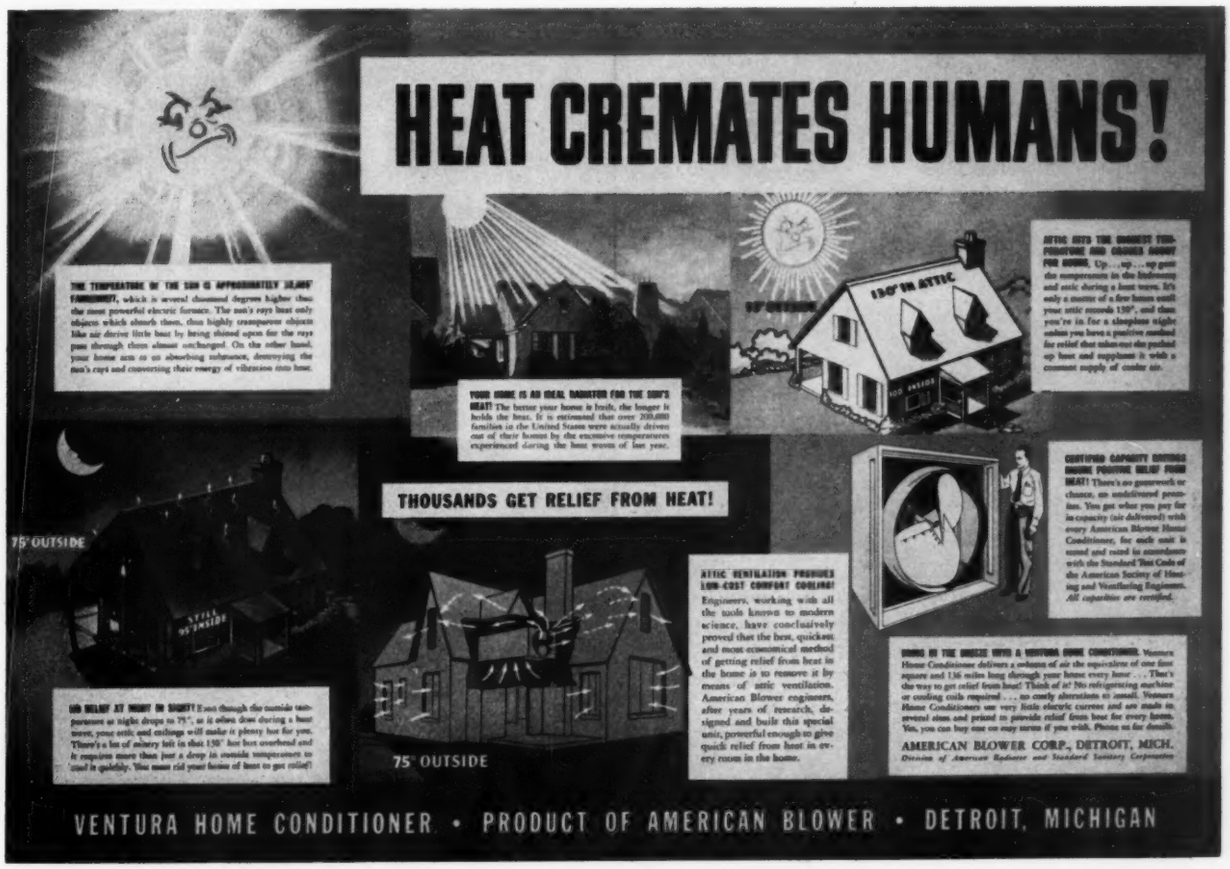
From customer records the service company first took 50,000 names and worked these down to 10,000 names on the basis of the particular localities where concentration was desired.

These envelopes of literature were then mailed to the 10,000 names.

In addition, a series of moving picture shorts were secured and scheduled at local theatres during the summer period.

The net result of this program, so far as utility records show was 23 residential and 5 commercial installations in 1936 and 45 residential and commercial installations in 1937.

[To be continued]


HEAT CREMATES HUMANS!
THOUSANDS GET RELIEF FROM HEAT!
130° IN ATTIC
75° OUTSIDE
75° OUTSIDE
ATTIC HEAT
ATTIC VENTILATION PROVIDES LOW-COST COMFORT COOLING!
AMERICAN BLOWER CORP., DETROIT, MICH.
VENTURA HOME CONDITIONER • PRODUCT OF AMERICAN BLOWER • DETROIT, MICHIGAN

Pattern Development for

Air Conditioning Fittings*

By William Neubecker
Head Instructor
Sheet Metal Department, New York Trade School

Reverse Center Stack Elbow with Curved Heel

FIG. 31 in the accompanying drawing shown *above* the double dividing line indicates two methods for developing the pattern shapes for a reverse center stack elbow or boot of the *curved heel type,* which can be assembled by using the Pittsburgh lock, if that is desired. The true geometrical rule will be described in developing the cheek in the first method. In the second method the cheek pattern will be laid out, by an approximate rule and while it is not geometrically accurate it answers the purpose for all practical work.

Patterns for Reverse Center Stack Elbow with Curved Heel. First Method

When laying out this type of elbow, a side elevation and plan are required. First decide what the radius of the throat should be and draw a right angle 5-*A*-11 in the side elevation. Using *A* as a center with the desired radius, draw the quarter circle 1-4 which divide into four spaces as shown by the heavy dots. From *A* draw a radial line through the first dot *C* to intersect the perpendicular line drawn from 1, at 2. In a similar manner from *A* draw a radial line through the third dot *d* to intersect the horizontal line drawn from 4 at 3. Draw a line from 2 to 3. Now make the distance 1 to 11 equal to the wide side of the elbow, and the distance 4-5 equal to the narrow side. Now take the vertical distance from 5 to *A* and set it off on the line 11-*A* from 11 to *a* from which point drop a vertical line to intersect the horizontal line drawn from 5, at 6.

From 2 draw a line parallel to 1-11 to meet the vertical line drawn from 11, at 1o. Now take the radius *a*-6 and using 1o as a center intersect the line 1-11 by the arc *b*. Using *b* as a center with *b*-1o as radius draw the arc 1o-6. Divide this arc in equal divisions as shown by 7-8 and 9. In practice more divisions must be used.

Below and in line with the side elevation draw the plan. In practice, one half plan is all that is required. *B-C* represents the center line in plan so that *C*-1o′ is the half distance of the narrow side of duct and *B*-5′ the half distance of the wide side. In the side elevation bending lines are drawn from 3 to 6 and 3 to 1o, which correspond to the bending lines 3′ to 6′ and 3′ to 1o′ in plan.

It now becomes necessary to find the plan view of the curved line shown by 6-1o in elevation. This is accomplished by first laying out the pattern for the heel as follow: Take the girth of the heel from 5 to 11 and set it off as shown from 5° to 11° at the right. Through these figures draw lines at right angles to 5°-11° indefinitely as shown. Now on either side of the center line 5°-11° lay off on lines drawn through 11° and 1o° one half the width of the narrow side of the rectangle as shown by 11^{v} and $1o^{v}$.

In a similar manner on either side of the center line 5°-11° on lines drawn through 5° and 6° lay off one half the width of the wide side of the rectangle as shown by 5^{v} and 6^{v}. Draw a line from 6^{v} to $1o^{v}$ intersecting horizontal lines previously drawn at 7^{v}-8^{v} and 9^{v}. This slant line 6^{v}-$1o^{v}$ allows for the use of the Pittsburgh lock and the various intersections between 6^{v} and $1o^{v}$ form the basis for finding the curved line 6′ to 1o′ in plan. 11^{w}-5^{w}-5^{v}-11^{v} shows the net pattern for the heel. From the various intersections 6 to 9 in side elevation draw perpendicular lines into the plan, until they intersect the horizontal line 5′-*D* as shown by the heavy dots. Now measuring in each and every instance from the center line 5°-11° in the heel pattern, take the various projections to points 6^{v}-7^{v}-8^{v}-9^{v} and $1o^{v}$ on the slant line, and place them in the plan, measuring in each and every instance from the center line *B-C* on similar numbered lines drawn from the side elevation, thus locating the intersections marked 6′-7′-8′-9′ and 1o′, through which points trace the miter or joint line corresponding to similar numbers in side elevation.

The pattern for the throat is laid out as shown at the upper left. Take the girth of the throat 1-2-3-4 in the side elevation and place it on the vertical line 1° to 4°. Draw the usual measuring lines as shown. Measuring from either side of the center line 1°-4° lay off half of the narrow side at the top and half of the wide side at the bottom. Connect points so obtained, then will 1^{w}-4^{w}-4^{v}-1^{v} be the net throat pattern and the slant line 2^{v}-3^{v} will be required in laying out the pattern

(*Continued on page* 100)

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STACK-ELBOWS-WITH-CURVED-HEELS

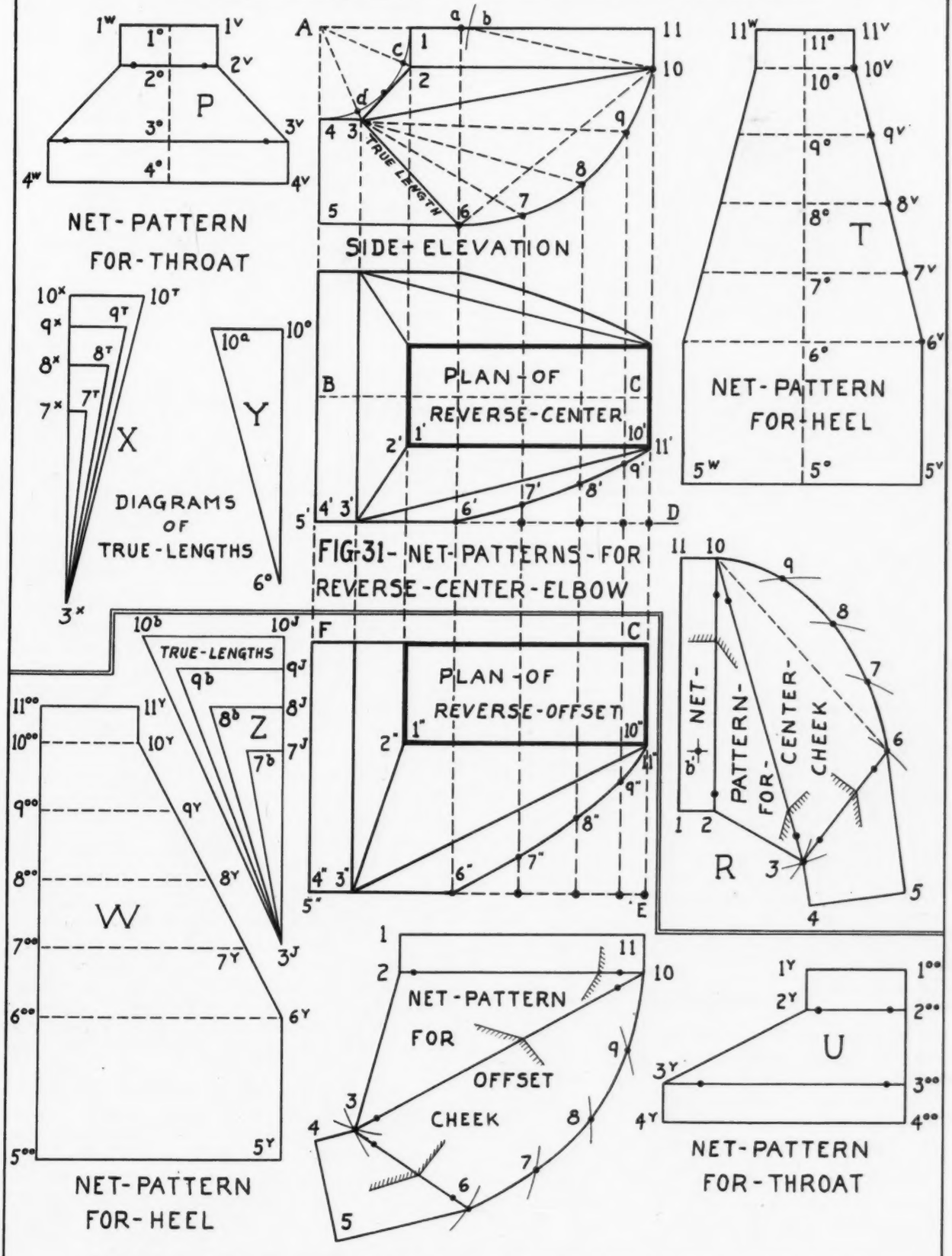
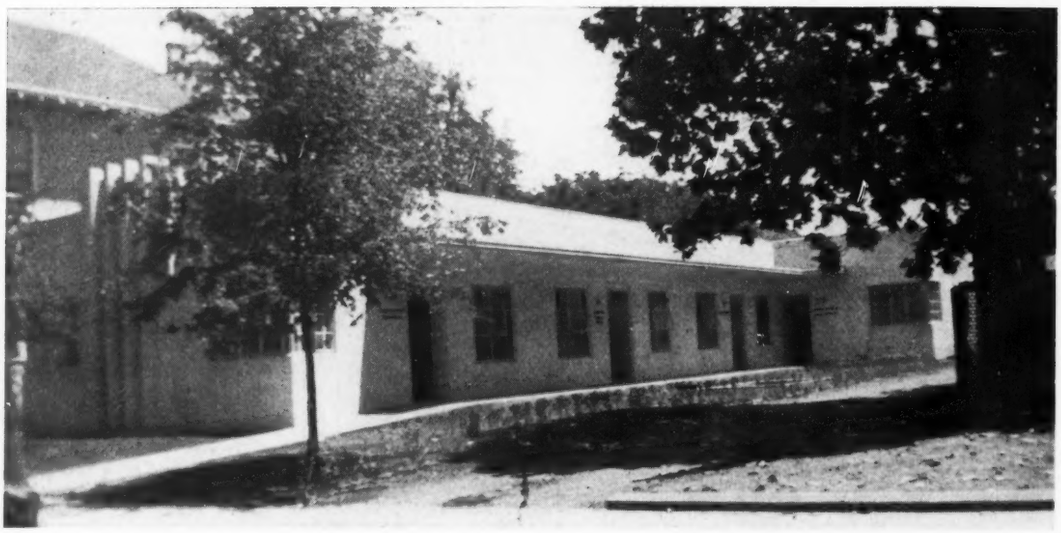


FIG-31-NET-PATTERNS-FOR REVERSE-CENTER-ELBOW

FIG-32-NET-PATTERNS-FOR-RIGHT-AND-LEFT-OFFSET-STACK-ELBOWS



A Gas Heated, Fan Cooled California Office Building

By W. W. Howe
Sausalito, Calif.

THE modern fan-furnace system, gas fired, is one of the most versatile and useful types of equipment ever placed in the hands of the heating contractor. It can perform the six functions necessary for complete air conditioning; heating, cooling, humidification, dehumidification, ventilating and filtration, at a lower cost in California, for the original installation than any other type of system and it will operate at a very low cost.

With the fan-furnace system, control of the fuel supply permits modulation of the temperature coming from the warm air registers. Thus in mild weather, the air coming from the warm air registers can be supplied at a lower than design temperature, merely by cutting down on the quantity of gas going into the burners. This can be accomplished automatically or manually.

Basic Heat Loss Items

The design temperatures used for this portion of California are usually 70 degrees for the inside of the building and 30 degrees for the outside. Once in a great while outside temperatures as low as 20 degrees above zero are experienced. About 3200 degree days is an average figure for Santa Rosa winter season. Before the advent of natural gas with a heat content of about 1050 BTU per cu. ft. oil was the common fuel. Present prices for Diesel oil are about 8c per gal., delivered, while gas for the building in question averaged about 89c per M. Some coal is used, but the price per ton is too high to compete with the two other fuels.

The Barnett building was erected during the summer of 1936. There are 17 rooms in four suites, all on one floor. No basement, with the exception of a 12 x 12 furnace room. The floor of the building is about 2 ft. above the ground line and the space between floor and ground is ventilated by a number of grills in the foundation walls. Side walls are regulation stucco construction, ceilings are ½" Celotex with a plaster finish and the floors are hardwood, laid on rough flooring.

Air in building	16,290 cu. ft.
Net exposed wall	1,904 sq. ft.
Glass, etc.	515 sq. ft.
Floor	1,810 sq. ft.
Ceiling	1,810 sq. ft.

The heat loss of the building is estimated at 100,000 BTU per hr. for the design temperatures of 70 degrees inside—30 above zero outside.

It was not deemed advisable to use any recirculated air in this building used for medical purposes, so the fan takes its air supply from the floor of the furnace room, the air entering directly into the filters.

As the side walls of the furnace room stop at the ground level, the top of the furnace room connects with the entire space under the building and the air going to the fan is actually pulled through the grilles in the foundation walls, comes across the ground under the building and then dropping into the furnace room.

Cooling by Fan Circulation

During warm summer weather, the fan is operated continuously for summer ventilation and cool-

ing and surprisingly enough, the trip taken by the air across the cool surface of the ground under the building, brings down the air temperature to a steady figure of 65 degrees. Several tests were made in hot weather and with an outside temperature of 86 degrees in the shade, the room temperatures were 75 degrees and the register air temperature was 65 degrees. Night summer temperatures, outside, are low—47° to 55°.

DESIGN DATA (Heating)

Bonnet temperature .....140° F.
Air supply temperature ..... 30° F.
Register temperature .....130° F.
Room temperature ..... 70° F.
Building heat loss.....100,000 B.t.u. per hour
Duct loss ..... 10,000 B.t.u. per hour
Available heat (130—70) or 60 × .24....14.4 B.t.u. per lb. air

$$\text{Lbs. of air per hr.} = \frac{110{,}000}{14.4} = 7{,}650 \text{ lbs.}$$

Heat required from furnace (140—30) or 110 × .24 = 26.4 B.t.u. per lb.
Lbs. of air (7650) × 26.4 = 201,960 B.t.u. per hour.
At 80 % furnace efficiency, input rating = 253,000 B.t.u.
Volume of air at 140°.....15.1 cu. ft. per lb.
Volume of air at 130°.....14.85 cu. ft. per lb.
Volume of air at 30°.....12.33 cu. ft. per lb.
Volume handled by the fan..... 94,000 C.F.H. = 1570 C.F.M.
Volume handled by duct system..111,500 C.F.H. = 1930 C.F.M.

The furnace selected and installed was the Electrogas No. 266 with an input rating of 266,666 B.t.u. per hour. The fan furnished with this furnace is rated to deliver 1840 C.F.M. against a duct resistance estimated as equal to .25 in. water column, static pressure. The maximum load on the motor, under these conditions, is 464 watts, so a ½ H.P. motor was specified.

Controls specified and installed were:
Thermostat.....General Control Co. Plain type. (Heat anticipating type would have been better.)
Fan motor control.....Mercoid M-53
High limit control.....Mercoid M-51
Electric pilot .....Electrogas
Electric gas valve.....1¼" General Solenoid
Time clock..Wesix time switch—4 cycles per 24 hours.
Summer by-pass switch..Ordinary electric switch-by-passing fan control.

The Humidity Problem

The furnace was equipped with an Electrogas humidity pan, located in the bonnet and a constant water level was maintained by means of a float valve, connected to city water supply. This pan has an area of about 200 sq. in. exposed to the air stream. Many say that there is no necessity for adding moisture to the air in a furnace job, especially in the Bay area.

At saturation, the weight of vapor present per cu. ft. of air is:
40°..... 2.86 grains. 1.43 grains for condition
70°..... 8.05 grains.
130°.....44.4 grains.
140°.....56.81 grains.

If air at 40° temperature and a R.H. of 50% enters the furnace and no moisture is added, the R.H.'s are:

Bonnet	1.43/56.81	2.5%
Registers	1.43/44.4	3.2%
Room	1.43 /8.05	17.9%

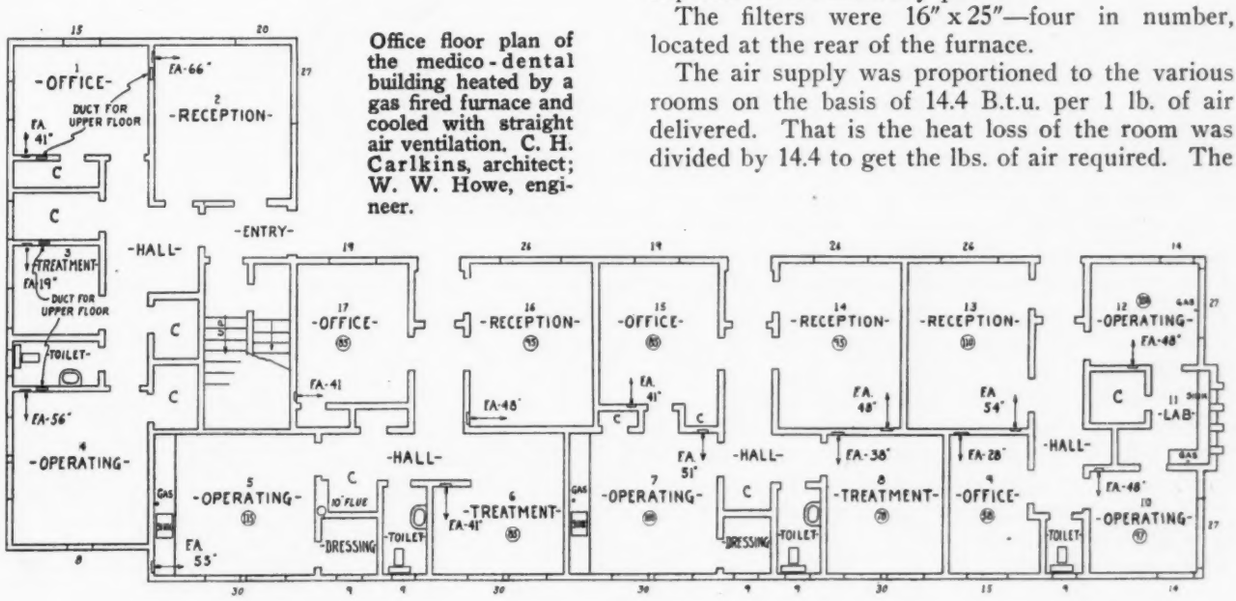
A R.H. of 17.9% we think will be considered much too low. If we suppose that a R.H. of 45% is about right, then there should be present 45% of 8.05 or 3.62 grains per cu. ft. We have 1.43 grains so it is evident that we should add 2.19 grains per cu. ft. and as we are handling about 102,000 cu. ft. per hour measured at 70°, we should add:

$$\frac{102{,}000 \times 2.19}{7{,}000 \times 8.3} = 3.85 \text{ gal. per hour}$$

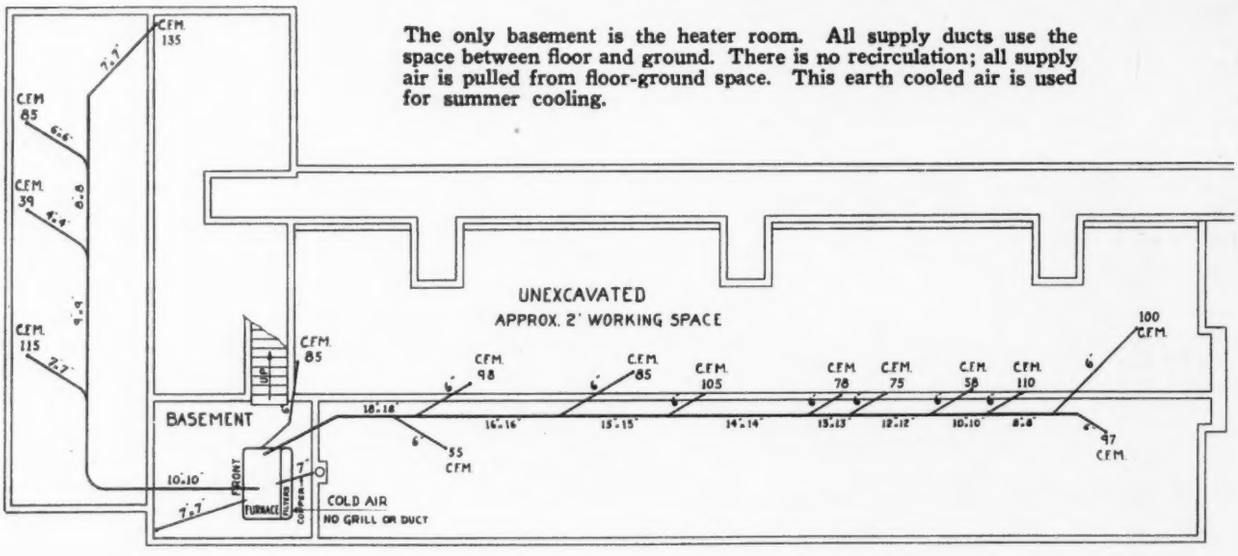
This means an evaporation of about .02 gallons per sq. inch of pan surface per hour. We have no figures to show what the actual evaporation of the pan is nor the relative humidities in the room. The water spray controlled by a humidistat is, of course, superior to the humidity pan.

The filters were 16" x 25"—four in number, located at the rear of the furnace.

The air supply was proportioned to the various rooms on the basis of 14.4 B.t.u. per 1 lb. of air delivered. That is the heat loss of the room was divided by 14.4 to get the lbs. of air required. The



Office floor plan of the medico-dental building heated by a gas fired furnace and cooled with straight air ventilation. C. H. Carlkins, architect; W. W. Howe, engineer.



The only basement is the heater room. All supply ducts use the space between floor and ground. There is no recirculation; all supply air is pulled from floor-ground space. This earth cooled air is used for summer cooling.

lbs. × 14.9 divided by 60 equals the cfm for any room. (14.85 is the volume at 130° of 1 lb. of air.) In theory, a reduction in air temperatures at the register should be made to correspond to the drop in temperature caused by the heat loss in the duct and this drop should be proportional to the distance between the register and the furnace. However, we assumed that the register temperature was 10 degrees lower than the bonnet temperature and that the resulting delivery of heat would be quite close enough.

Duct and Register Design

The duct and register design was based on the theory that the velocity of the air through the registers would be 300 F.P.M. and the velocity of the air in the ducts would be 500 F.P.M.

A study of the theory of duct design and observation of actual duct construction under field conditions led us to the conclusion that to design for equal friction was frequently a waste of time as the actual construction would not follow the plan closely enough. In actual experience we have found that ducts sized on the basis of 500 F.P.M. velocity give very good results and that only a slight balancing of the system with the branch duct dampers is necessary.

Another point found by later experience is that the free area of the registers might just as well be based on 500 F.P.M.; that is the same velocity as the ducts as the expected reduction in velocity at the registers from 500 to 300 F.P.M. does not materialize and if the registers are based on 300 F.P.M. velocity, only a portion of the register is actually effective.

All duct work was covered with ¼" aircell.

The five points of air conditioning covered by the design were: Heat, humidification, filtration, ventilation, partial summer cooling.

Thus the only additional feature possible would have been mechanical cooling equipment.

The original specifications for the building called for oil burning equipment and the owners were very skeptical as to the question of gas fuel, fearing that a heavy operating cost would result. It became necessary to make an estimate for the operating cost, as follows:

Rated furnace input.....266,666 B.t.u. per hour
Cu. ft. gas per hr. to deliver rating.....232 cu. ft.

The building is only used in the daytime—very infrequently at night.

We assumed that the average daytime temperature for the winter period would be 55°. 70—55 equals 15°. 70—30 equals 40°. The average run should be, then 15/40 of the maximum, or 37½%. 37½% of 232 cu. ft. gives an average gas consumption of 88 cu. ft. per hour. Figuring 10 hours run per day, 25 days per month, 6 months per season, shows a run of 1500 hrs. per season × 88 cu. ft. equals a total gas consumption of 132,000 cu. ft. per season.

We allowed 3000 cu. ft. per month for a storage water heater which was to be installed and 500 cu. ft. per month for small doctor's appliances.

Gas for furnace.....132,000 cu. ft.
Gas for water heater..... 36,000 cu. ft.
Gas for other usage..... 6,000 cu. ft.

Total gas per year.....174,000 cu. ft.

Breaking this down to a monthly basis, we have:

Month	Per Cent for Heat	Furnace	Water Heating Small Appliances	Total	Cost
January	20	26,400	3,500	29,900	21.44
February	11	14,500	3,500	18,000	16.53
March	11	14,500	3,500	18,000	16.53
April	5	6,600	3,500	10,100	10.27
May	3	3,960	3,500	7,460	8.17
June	..	.....	3,500	3,500	4.90
July	..	.....	3,500	3,500	4.90
August	3	3,960	3,500	7,460	8.17
September	5	6,600	3,500	10,100	10.29
October	11	14,500	3,500	18,000	16.53
November	11	14,500	3,500	18,000	16.53
December	20	26,400	3,500	29,900	21.44
12 Months	100%	132,000	42,000	174,000	155.78

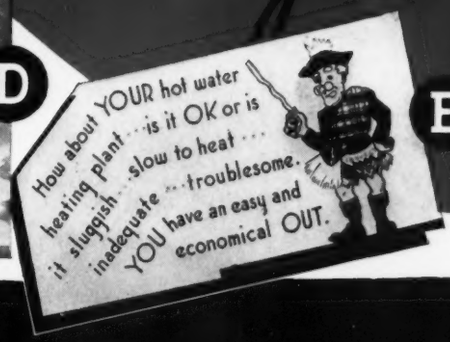
(*Continued on page* 96)

A

B

C

D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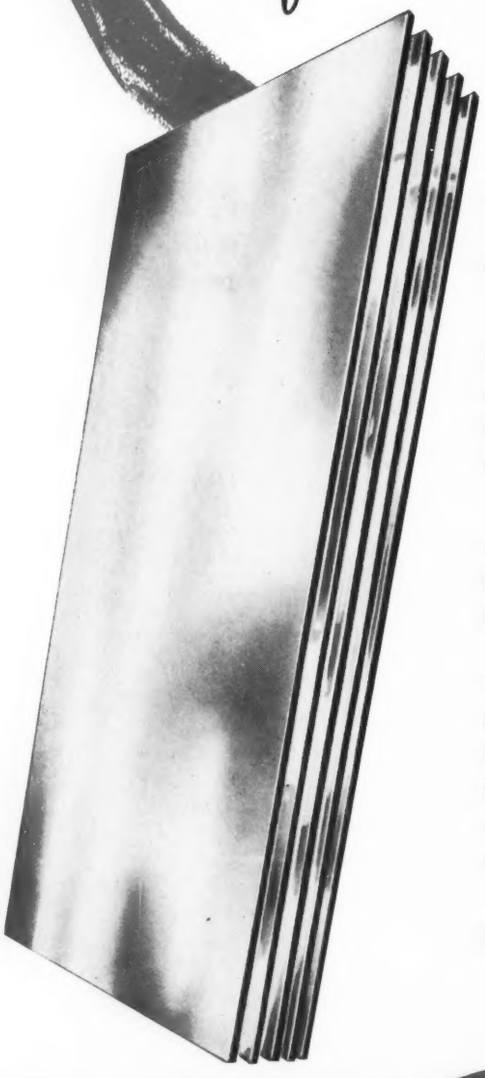

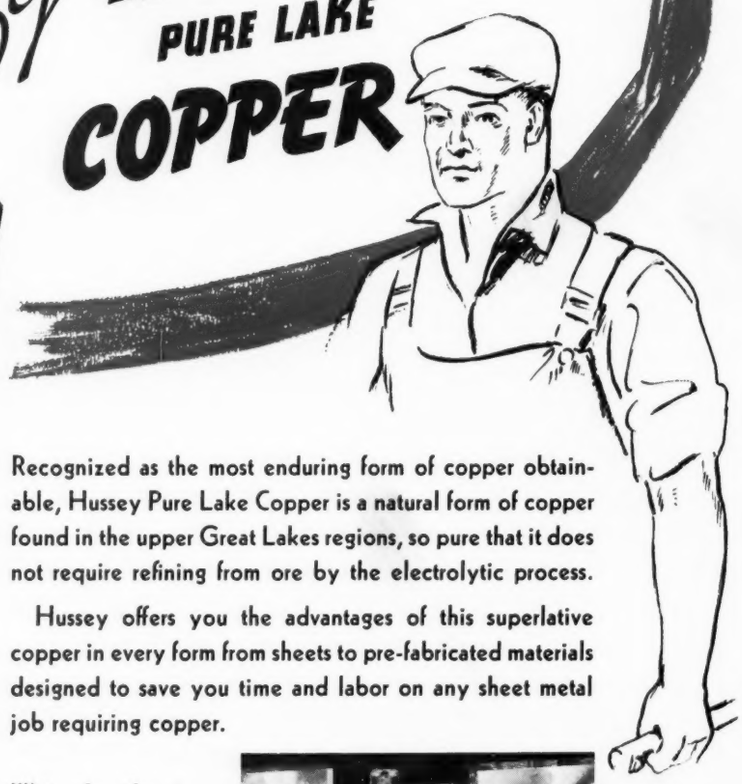

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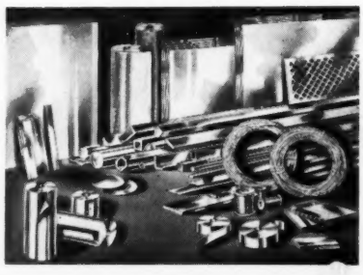


C. G. HUSSEY & COMPANY
(*Division of Copper Range Co.*)
Rolling Mills and General Offices: Pittsburgh, Pa.
Warehouse Stocks in the Principal Cities

Copper HUSSEY Brass

The Licensing and Permit Code of Toledo, Ohio

The first four sections of the Toledo code, covering installation and location of furnaces, chimneys, organization of the Toledo heating board, were published in the April issue. Sections 5 to 19 published here complete the code. A code covering mechanical warm air heating is nearly ready for adoption. Copies of this gravity code may be obtained from Henry C. Bitter, Secretary, Toledo Sheet Metal and Roofing Contractors Assn., Inc., 714 George St., Toledo, O.

Section 5.

The term Warm Air Heating Shops, as used in this ordinance, shall be defined as places of business established, equipped, maintained and conducted by an individual, firm or corporation for the purpose of engaging in and carrying on the work or trade of cleaning, repairing, replacing, remodeling, or installing Warm Air Heating Systems for the public generally.

Section 6. Application; Re-examination; Display of License

Every person, desiring to be licensed as provided in this chapter, shall file with the Building Inspector upon a form blank furnished upon request by Building Inspector, verified under oath, setting forth the facts which entitle the applicant to examination and licensure under the provisions of this ordinance. The application and examination fee shall be Two and one-half ($2.50) dollars. Upon failure to pass each applicant shall have another opportunity to take the examination, the applicant shall receive a license from the Director of Public Safety entitling him to practice Warm Air Heating in this city; which license shall be duly registered.

Every person, partnership, and corporation must have a licensed individual under this ordinance in his or its employ supervising the installation and performance of all warm air heating work.

Section 7.

On the payment of the registration fee as hereinafter provided, and upon filing of an application properly executed, and, upon having qualified by passing the examination as provided herein, the Commissioner of Inspection shall issue a license.

Section 8.

If a Warm Air Heating Contractor shall maintain more than one establishment or shop for the transaction of business then said contractor shall obtain a license for each such establishment or branch.

The original license fee shall be $25.00. Renewal license shall be issued to contractors upon the payment of an annual fee of TEN ($10.00) DOLLARS. If a contractor shall fail to secure a renewal of license within sixty (60) days after the expiration date of his certificate or license, he shall be required to pass examination and pay the regular annual fee as in the original application. In no case shall the unearned portion of a fee paid be returned to a Warm Air Heating Contractor whose license has been revoked or annulled by the Director of Public Safety for any cause as hereinafter provided.

Section 9.

The Director of Public Safety with the advice of the Board of Warm Air Heating shall have the power to revoke or annul all licenses under this ordinance. Any license issued hereunder may be annulled or revoked for the violation of any section of this ordinance.

Section 10. Hearing of Complaint; Reprimand; Suspension & Revocation

Director of Public Safety shall hear all complaints on any licensee and may reprimand, suspend or revoke the license of any licensee whose conduct has violated any section of this ordinance or rules of the Director of Public Safety.

Section 11.

Any person, firm or corporation upon conviction of violating any provision of this ordinance, shall be deemed guilty of a misdemeanor and shall be fined not less than FIVE ($5.00) DOLLARS, nor more than FIVE HUNDRED ($500.00) DOLLARS. Each violation of any provision of this ordinance shall constitute a separate offense.

Section 12.

All fees received for the insurance of such license shall be paid to the Commissioner of Treasury, and paid into the Treasury of the City of Toledo, to the credit of the General Fund.

Section 13.

The inspection fee for a replacement of a Warm Air furnace or alteration of a Warm Air Heating System shall be TWO ($2.00) DOLLARS. The minimum inspection fee for a complete Gravity Warm Air Heating System shall be THREE ($3.00) DOLLARS. This rate shall apply on systems requiring 75,000 B.T.U. per hour or under. An additional fee of 50c shall be added for each 25,000 B.T.U. per hour or fraction thereof, required, in addition to 75,000 B.T.U. per hour. The minimum inspection fee for a Forced Air Heating System shall be THREE and 50/100 ($3.50) DOLLARS. This amount shall apply to such systems requiring 75,000 B.T.U. per hour or less. An additional fee of 50c shall be added for each 25,000 B.T.U. per hour or fraction thereof required in addition to 75,000 B.T.U. per hour.

Section 14.

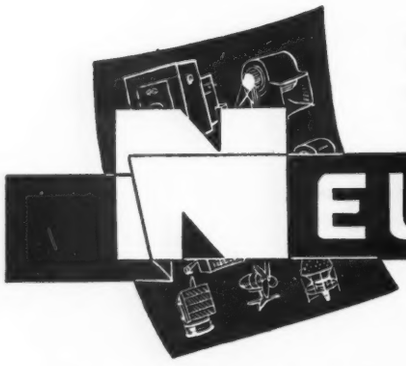
It shall be unlawful to proceed to remodel, install, or change a warm air furnace or piping within the City of Toledo, without a permit being first obtained from the Commissioner of Inspection.

Section 15. Duty of Inspectors

(a) It shall be the duty of the inspector of buildings to inspect all warm air furnaces hereafter installed or constructed in conformity with the provisions of this ordinance relating thereto.

(b) Inspection of new work shall be made as follows: When such work has proceeded to where the stack to upper floors and heads for all side wall registers have been installed and boots have been connected, the contractor for this work shall notify the inspection department, who shall

(*Continued on page* 102)



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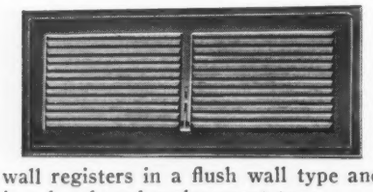
NEW PRODUCTS

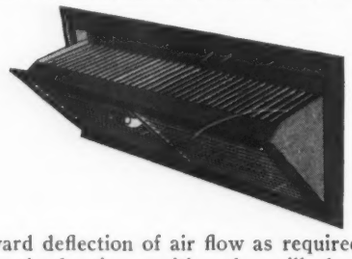
70—Air Conditioning Registers

Eckenroth Register Company, Inc., 447 Sutter St., San Francisco, California, is introducing a new line of "All Season" combination air conditioning



wall registers in a flush wall type and in a baseboard replacement type.

Individually adjustable grille bars in the cooling position provide easy up-



ward deflection of air flow as required. In the heating position the grille bars are set at a downward angle of 22 deg. for efficient warm air distribution.

◆

71—Section Cabinet Units

Furblo Company, Hermansville, Michigan, has designed the Series 300 cabinet units made in two sections with three advantages to the user—access

doors may be placed on any desired side, sectional construction permits the unit to enter any ordinary doorway, and installation is easier. Dual mounting of motors is furnished in the 10, 12 and 14 in. sizes of Series 300 units (except No. 321 which is bottom rear mounting only). In 16 and 20-in. sizes, motors are bottom rear mounted.

◆

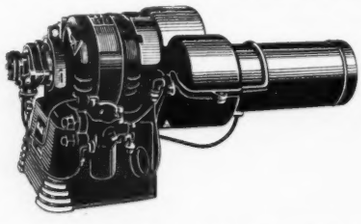
72—Thermostat

A new model thermostat manufactured by the D. H. McCorkle Co., Berkeley, California. Hal Van Doren, industrial designer of Toledo, designed the instrument, and the Remler Company, San Francisco, molded the housing of Plaskon.

◆

73—Branford Model F

The Malleable Iron Fittings Co., Branford, Conn., has designed Model F to meet the heating requirements of the average home. The parts used are the same as those used in the de luxe



Model A Branford, differing only in that the oil pump is connected directly to the motor shaft and operates at motor speed.

◆

74—Dynamic Precipitator

American Air Filter Company Inc., First and Central Avenue, Louisville, offers the Roto-Clone, a dynamic precipitator, for difficult dust problems. This is a combined exhauster and dust separator with water sprays.

Their bulletin No. 274 contains engineering data and performance tables.

◆

△75—Kem Metal Paints

Sherwin-Williams Co., of Cleveland, announces S-W Kem-Metal protective paints—Kem-Kromik metal primer, Kem-Elastic metal protective paints and Kem red lead (primer).

The feature in the formulating of these new products is said to be their chemically evolved (synthetic) S-W Kem Liquid. Advantages include faster drying, easy brushing and improved appearance.

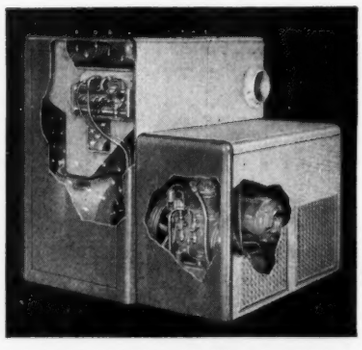
Weathering leaves an ideal surface for repainting at the proper time.

◆

76—Comfortrol Series

The Waterman-Waterbury Company, Minneapolis, Minnesota, announces the new Comfortrol Series 1000, 900 and 1100, giving complete winter air conditioning. The makers claim a new "high" in efficiency—about twelve per cent more heating surface per gallon of fuel oil input—with long flue gas travel and high velocity of flue gasses.

The Series 1000 is complete with Oil-O-Matic oil burner and Minneap-



olis-Honeywell controls; the series 900 is furnished without burner or controls, for use with any good gun-type oil burner; and the Series 1100 comes complete with the improved Waterbury gas burner.

The unique feature claimed is the Waterbury air washer unit which is furnished as optional equipment at extra cost—a combination with cooling unit and compressor. The Thermo-Drip humidity control is furnished with a water pan as standard equipment, but the air washer unit may be added later if desired. In this case, it replaces the water pan, but the Thermo-Drip control can be left to automatically control the supply of water in relation to the heat in the furnace bonnet.

The air washer unit is so made that a cooling coil may be easily added whenever wanted. In localities where cold water, 55 degrees or lower, is available this cooling coil may be used for summer cooling. If the cold water is not available then the compressor is required in combination with the cooling coils for summer cooling.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use the coupon on page 94.

△77—Insulating Cement

Baldwin-Hill Co., 527 Klagg Ave., Trenton, N. J., manufacturers of Rockwool insulation products, has recently gone into the production of No. 1 Insulating Cement, adaptable for use on boilers, drums, walls, ducts, valves, breechings, flanges and similar hot equipment. No. 1 Cement is said to

be highly effective up to 1800 deg. F. with an exceedingly low heat loss factor. Applied on a clean surface, it adheres immediately, forming a continuous blanket of insulation without joints, and strengthens considerably upon drying. No. 1 Cement also has a high covering capacity with low volume shrinkage. It is easily applied. Complete instructions for mixing and applying are included in each 50-lb. bag. When equipment is to be replaced, No. 1 Insulating Cement is reclaimable. It may be removed, mixed with water and used again.

◆

•78—Lectro-Shear

The Black & Decker Mfg. Co., Towson, Md., is offering a portable Lectro-

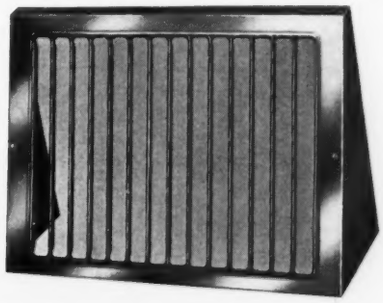
Shear in 16 and 18-gauge sizes for cutting steel, galvanized iron, monel metal and stainless steel. In copper, tin, aluminum, lead and other non-ferrous metals, they say the capacity is approximately fifty per cent greater.

The Lectro-Shear is simple in design, light in weight and handles easily and conveniently, and will cut to a minimum radius of ¾ inch.

◆

79—Gravity Registers

Tuttle & Bailey, Inc., Corbin Avenue, New Britain, Conn., announces a new line of gravity registers—base-



board, sidewall and return air intakes.

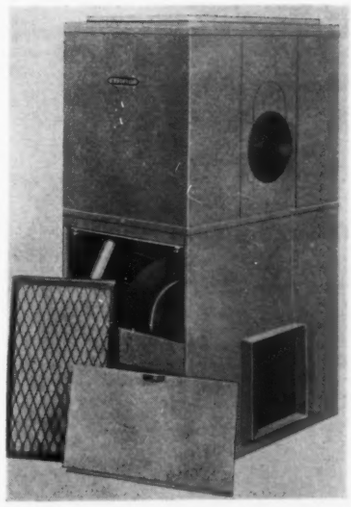
The bar type design of the No. 20 baseboard register provides unusually high free area, and the face is easily removed for installation. Damper

opens to 90 deg. on a rugged, durable friction hinge. Adjustment of friction is made from the front of the register by a turn of a screw driver. Sidewall register No. 30 matches in design and appearance, and is equipped with removable flange to simplify installation.

◆

•80—Super-Heater Blower Unit

The Majestic Company of Huntington, Indiana, has just announced a new Super-Heater blower unit that is reported to increase the efficiency of any oil or gas converted, conventional gravity furnace from 33⅓ to 50 per cent. The unit is composed of a Super-Heater radiator, filters and blower unit. It is cut-in on the furnace radiator outlet, thereby harnessing hot gases that ordinarily go up the chimney, providing 44



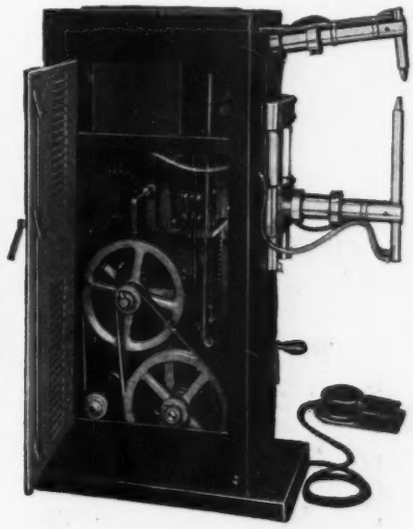
sq. ft. of additional heat radiating surface that preheats the cold air as it is pulled from the top of the unit through the filters and forced into the main heating plant. Through provisions in the casing to raise or lower the Super-Heater radiator, it is easily adapted and installed on any make furnace.

The casing is of an attractive design and finished in blue ripple.

◆

81—Automatic Spot Welders

Pier Equipment Manufacturing Co., 800 Cross St., Benton Harbor, Michigan, announces a new series of automatic spot welders which accomplish both increased output and decreased effort in control of their operation.



They provide control over the welding variables essential to efficient, uniform production. They have many desirable features, outstanding of which are the Reeves Vari-Speed Transmission having a 3 to 1 ratio of speed variation, mechanical weld timing control whereby welding time can be set to as fast as 1½ cycles or 1/40th of a second; and precision of pressure application and accuracy of timing heretofore available only at higher prices.

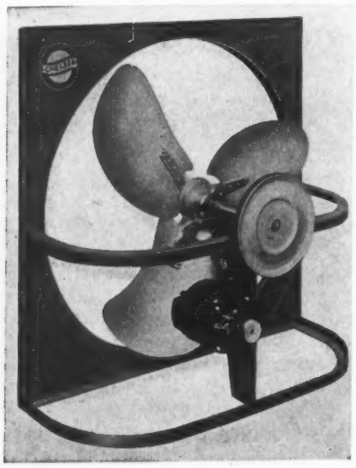
These welders are made in four sizes, 15, 20, 30 and 50 KW.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use the coupon on page 94.

△82—Attic Fan

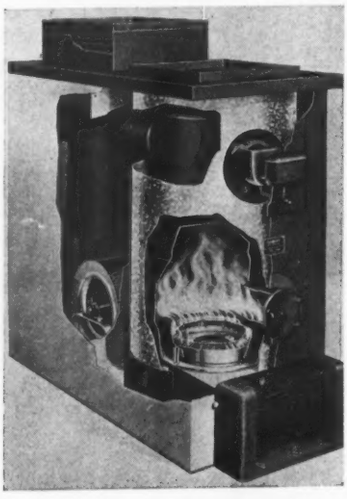
Chelsea Fan & Blower Co., Inc., 370 West 15th St., New York City, is offering a new attic fan for home cooling by attic ventilation. This fan is designed in such a way that it can be



installed in walls or penthouses, and may also be used as a portable floor fan due to a self-supporting feature. The propeller is of the three blade type, designed to deliver a large volume of air at a slow speed with a minimum of noise.

◆83—Oilfurnace

Timken Silent Automatic Division, The Timken-Detroit Axle Company, 100 Clarke Avenue, Detroit, through T. A. Crawford, general sales manager, announces a new, lower priced



winter air-conditioning unit, built and engineered specifically for small and medium sized homes—the Timken Model FCR Oilfurnace.

"The new oilfurnace burns only one gallon an hour at top capacity and it heats, humidifies, cleans and circulates heated air in every room."

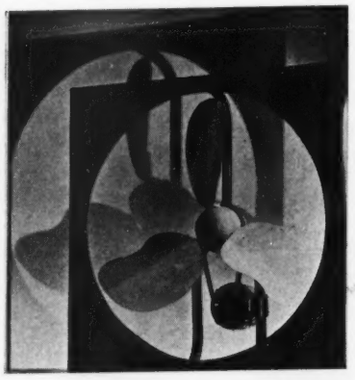
The complete winter air-conditioning unit is housed in an attractive, compact cabinet—length 66 in.; width 29½ in.; height 55 in.

The new model has Timken's "Live Heat" features — wall-flame burner, chromium steel flame rim and chromium steel hearth. A deep doughnut-shaped radiator is mounted directly behind the furnace body. Baffles force the hot gases to go down the side to the bottom and up the other side to the top before they reach the chimney. Btu output at bonnet is 110,000.

Another exclusive feature is the Mono-Rotor, the burner's only moving part, which spins like a top on an anti-friction bearing lubricated by oil passing through to the flame. Control is fully automatic.

◆84—Streamline CirCOOLator

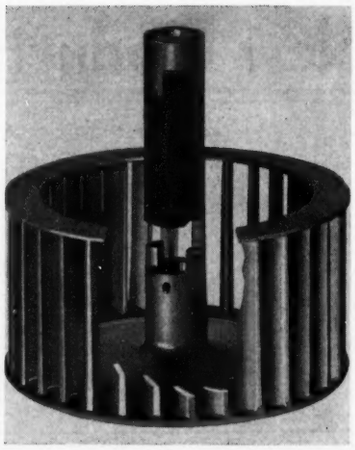
Viking Air Conditioning Corp., Main and Center St., N. W., Cleveland, Ohio, has announced a fan for home cooling by attic ventilation. Quietness,



they say, was the first consideration in the design of the new Viking CirCOOLator. The blade shape and pitch, number of blades, and the speed of the fan have been so proportioned that the fan when operating is inaudible even in the quietness of the night. Every part of the new fan has been streamlined. The inlet cone is flared into a funnel shape which guides the air into the fan smoothly and without resistance. The three supporting members are streamlined and are located well away from the fan blades, so as not to interfere with the air flow.

A unique detail of the CirCOOLator fan is the streamlined hub which combines the bearing, hub and fan pulley into one streamlined assembly.

The Streamline CirCOOLator is made in three sizes having capacities of 7500 cfm, 11500 cfm, and 16500 cfm, respectively. A modified design with larger motors and slightly higher speed is available for commercial use.



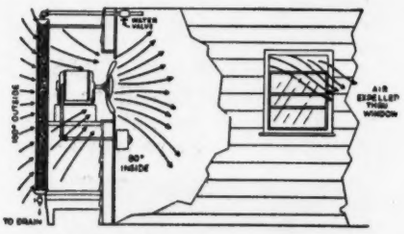
85—Flexible Coupling

Lovejoy Flexible Coupling Company, 5009 West Lake Street, Chicago, Ill., announce to manufacturers of oil burners, and other equipment where the load is not in excess of one-fourth horsepower, an application of the L-R flexible coupling principle.

It is now possible to purchase from fan makers, fans with a hub built in the form of an L-R Flexible Coupling jaw, for which there is no extra charge when the hub length is standard. If this is done, only two units have to be purchased to complete the coupling, —one UX hard rubber center piece, or cushion, and one jaw, resulting in a reduction in the cost of a complete coupling assembly.

◆●86—Evaporative Cooling Assemblies

Wagner Electric Corporation, 6400 Plymouth Ave., St. Louis, Missouri, has developed a line of motor and fan blade assemblies suited for evaporative coolers. In a typical method, the cooler consists of a window box with an ex-



celsior or fiber mat approximately two to three inches thick, placed in a vertical position with provision at the top for dripping water through the excelsior or pad. Cooling is produced by drawing large volumes of air over the moist mat. In order to obtain proper cooling, it is necessary to circulate a sufficiently large volume of air to provide a complete change of air every two or three minutes.

Evaporative cooling fan assemblies are available in a complete range of single-speed and three-speed fans in 25 to 60 cycles, and in sizes from 16 in. S1 to 19¼ in. K3 types.

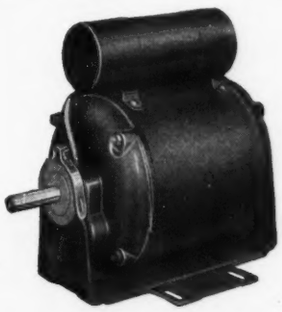
Bulletin 185 describes in detail evaporative coolers and their fan assemblies.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use the coupon on page 94.

87—High Torque Motor

The Wagner Electric Corporation, St. Louis, Mo., announces the addition of high-torque double-capacitor motors to their line of single-phase motors. These new motors are designated as type RZN when equipped with rigid mountings and type RZNR when equipped with annular resilient mount-



ings. They are available in 110/220 volts, in sizes ⅓, ½, ¾, and 1 horsepower ratings.

The motor has two condensers of different value—a high value of capacitance for starting and a low value of capacitance for running. The change in capacitance occurs at approximately 75 per cent full-load speed by means of a centrifugal switch located on the motor.

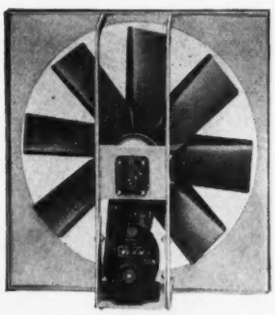
It is expected that the high-torque double-capacitor motor will find application on humidifiers, stokers, refrigerant compressors, or where high starting torque, constant speed, quiet operation and long-hour performance are required.

◆

88—Coolvent System

Autovent Fan & Blower Company, 1805 N. Kostner Ave., Chicago, Illinois, announces the Coolvent system of ventilation.

The unit is finished with white panel and red fan wheel. Construction com-



prises a heavy gauge steel plate to which is attached sturdy support arms holding the motor platform that is adjustable for proper belt contact. Extra broad-bladed fan wheels in sizes ranging from 24 to 54 inches are available for quiet operation in club rooms, dance halls, theaters, cafes, hotels, undertaking parlors, shops, offices and homes.

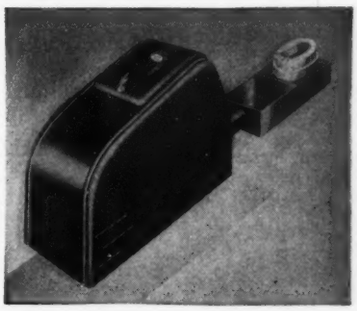
Exceedingly quiet slow speed operation is secured through use of a "V" belt drive with a special resilient base motor underslung beneath fan. The fan wheel itself is reinforced against vibration with the shaft securely held in alignment by two double reservoir, flange pillow block bearings.

◆

△89—Peerless Stoker

The Peerless Manufacturing Corporation, Louisville, Kentucky, has announced the new Peerless stoker at a price which they say puts it within the reach of every home owner and even tenants of moderate incomes.

Some of the features of the new Peerless Stoker are: continuous feed



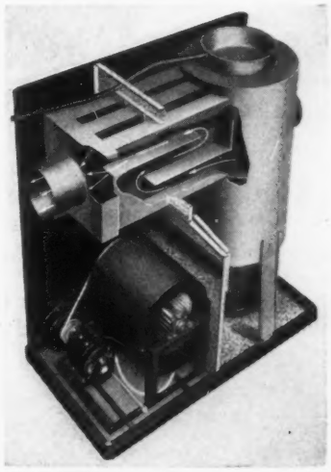
gear transmissions, with three rates of coal feed; complete automatic controls; hood sound-proofed, with plastic material; automatic air-control and specially adapted wind boxes to suit practically all furnaces and boiler installations; sectional tuyeres; completely sealed hoppers; standard recognized makes of motors; a complete line of sizes and models. It is finished in a blue-green pastel lacquer, striped and trimmed to give it eye appeal.

◆

90—Oil Air Conditioner

Perfection Stove Co., Cleveland, Ohio, announces new models of the Superfex oil burning warm air conditioner, with a new economizer that provides longer flue travel and increased efficiency.

"The increased radiating surface gives a new high in efficiency—actually 80 per cent plus," said C. H. Foulds, sales manager of the manufacturer's furnace division. He pointed out that all Superfex air conditioners operate on the high-low principle, the oil burner automatically synchronizing with the blower, thus providing contin-



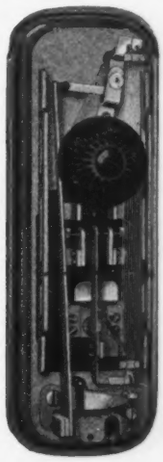
uous circulation of conditioned air 24 hours a day.

There are three models, with heating capacities of 65,000, 100,000 and 140,000 Btu's, respectively, at the registers.

◆

91—"Comfortrol"

Julien P. Friez & Sons, Inc., Baltimore, Maryland, announces the new Friez "Comfortrol" or Effective Temperature Control Instrument. The Friez Comfortrol has been designed to provide automatic control in terms of constant Effective Temperature or bodily sensitive comfort condition, rather than control, in terms of a fixed dry bulb temperature. Basically, it is a humidity-compensated thermostat, which varies its own dry bulb temperature point of control to bal-



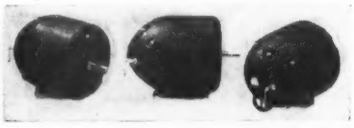
ance the uncontrolled variations in relative humidity which exist in automatic heating and cooling applications. The amount of automatic adjustment of the point of temperature control is in the ratio specified by the American Society of Heating and Ventilating Engineers. The New Friez Comfortrol replaces the ordinary Thermostat for use on all types of automatic heating, cooling, and air conditioning comfort installations, and not only provides considerably greater comfort but also effects economy in operating cost.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use the coupon on page 94.

92—Air Circulator Motor

The Ohio Electric Mfg. Co., 5910 Maurice Ave., Cleveland, has just put into production new motors of special shape to blend with the usual air circulator design, and to offer the least



possible resistance to the flow of air. These motors are built with split phase windings for 1150 or 1725 rpm with start and stop pull switch; also with windings for two speeds—860 and 1140 or 1140 and 1725 rpm—with a three position pull switch.

The finish may be smooth or crinkle enamel—⅛, ⅙ or ¼ HP sizes.

93—Almar-Bittner Flanger

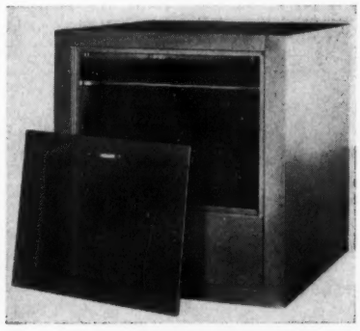
Ward Machinery Company, 564 W. Washington Blvd., Chicago, announces the latest addition to the Almar line of Corner Lock Forming Machines—the newly designed Almar - Bittner power flanging machine.

One of the outstanding improvements on this machine is the hinged head which permits the flanging of inside or outside complete circles instantaneously.

The sales engineers for the Ward Machinery Company are now equipped with miniature working models of this machine and will make demonstrations in any shop on appointment.

94—New Brundage Models

The Brundage Company, Kalamazoo, Michigan, displayed three new models at the recent Detroit Builders Show—a low-priced blower filter package designed especially for converting gravity furnaces into forced air jobs, or use as a booster; a humidifier-blower designed to meet the aridity problem in homes using forced-air



heating; and a new package unit using a top-mounted motor in a restyled rounded corner casing. All three units are finished in a green crackle.

The SKF 300 series includes blower, motor, drives, adjustable motor pulley, compensating motor suspension, filters, and casing.

The HC 500 series — humidifier-blower—is a blower-filter unit, combined with accurately controlled humidification process. Humidistat is standard equipment.

HEATING and AIR CONDITIONING
with the COMPLETE **WISE** LINE

Competition will be keen in the Air Conditioning and Heating field this season, and the edge will go to the contractors who can give the "most for the money." You can't help but give your customer the best of the bargain when you install WISE Air Conditioning or Gravity units. Their peerless performance ranks them as the outstanding line in the field, but *still* at a price easily afforded by any homeowner.

Install a WISE Air Conditioning unit or Gravity furnace on *all* your jobs and be sure of peak performance under any conditions and complete customer satisfaction.

Shown at left is the modern WISE Air Conditioning unit. A real air conditioner for modern homes.

At right is the WISE Series A — containing everything necessary for perfect economical heating.

ALSO **Automatic gas-fired heating and Air Conditioning units of proven merit.**

WISE FURNACE COMPANY - AKRON, OHIO

Association Activities . .

National

The summer meeting of the National Warm Air Heating and Air Conditioning Association which is to be held in the Plankinton Hotel, Milwaukee, Wisconsin, June 13, 14, 15, 1938, promises to be another big event of the Industry.

The Program is practically complete and has been formulated with particular reference to topics of interest to dealers and jobbers, as well as manufacturers and engineers.

The entertainment features will include a very unusual party on Tuesday evening and a Golf Tournament for all in attendance on Wednesday afternoon.

Formal announcement and program for this convention will be issued the latter part of May.

All of the sessions will be open to non-members as well as members, and all interested in furnace air conditioning in all of its phases are cordially invited to be present.

Allen W. Williams, Secretary.

◆

New York

Metropolitan Conference of Roofing, Sheet Metal and Air Conditioning Contractors, with headquarters at 336 Lincoln Building, New York City, elected the following officers at the convention held on March 29, 30 and 31, 1938 at the Hotel Astor, New York City:

President:
Richard H. Freyberg, New York City.
Vice Presidents:
George F. Brown, Hollis, L. I.
A. A. Daly, Jersey City, N. J.
Karl Gohlke, Brooklyn, N. Y.
J. H. Griffin, Bronx, N. Y.
Oscar Neilson, Brooklyn, N. Y.
Frank J. Scallon, Norwalk, Conn.
Treasurer:
F. William Tischler, New York City.
Executive Secretary:
Irving Payson Zinbarg, New York City.
Directors:
P. J. Barry, New York City.
J. E. Brower, Atlantic City, N. J.
Lawrence C. Corvi, New York City.
John E. Daly, Wallingford, Conn.
Arthur A. Drachsler, New York City.
Lawrence E. Gichenor, Washington, D. C.
Emil Karmin, Brooklyn, N. Y.
F. Root, Brooklyn, N. Y.
William Schreck, Jersey City, N. J.
David Tischler, Union City, N. J.

The convention program included: "The Organization and Its Purposes, by R. H. Freyberg; "The Oxy-Acetylene Process as Used in Sheet Metal" with pictures, by W. B. Nicholson of Linde Air Products Co.; "Proposed Solutions to Roofing Problems," by J. McCawley; "Re-Siding and Shingling" by George F. Brown of The George F. Brown Construction Co.; "Roofing Practices," by J. M. Berden of Johns-Manville Co.; "Proper Application of Sheet Copper," by Carter J. Cole of Copper & Brass Research Association. There was a small exposition in connection with the convention.

Subsequent to the convention, all of the officers and members of the board had their first meeting and it was decided to change the name of the association to "Associated Roofing, Sheet Metal and Air Conditioning Contractors" and to incorporate under that name.

Irving P. Zinbarg, Executive Secretary.

◆

St. Louis

The St. Louis Heating and Sheet Metal Wholesaler's Association, at its semi-monthly meeting recently, decided to ask those jobbers and wholesalers not affiliated with the corporation so that we may do more effective work.

The Educational Department has been instructed to work up several installation charts, suggesting to the installer all the necessary material and supplies needed for a complete job, so that they may, by comparing this chart with their jobs, be in a position to figure each item, not forgetting any.

Oscar P. Brauer, Secretary.

Selling Stoker-Ola Is Such a Logical Thing to Do!

We've said it before—we say it again.

Stokers are such an important part of the furnace installation picture today that any dealer is overlooking a most logical source of increased sales and profits—as well as increased satisfaction from his customers!—if he isn't pushing stokers. And

STOKER-OLA

is the logical stoker. It has "everything"—quality, looks, 3-year guarantee, adaptability, simplicity—and PRICE. Check these figures against those of ANY other stoker:

- Repulsion-Induction Motor.
- Heavy cast-steel screw.
- Ball-Bearing—for long life.
- Minneapolis-Honeywell controls.
- Unlimited coal feed control.
- Full control of air and coal.
- Absolutely gearless ("No gears—More Years").
- Only Two major working parts.
- Famous for its simplicity.
- Large, easy-to-fill hopper.
- Off-set hopper for easy clinker removal.
- A STOKER-OLA for every heating job.
- Three-year Guarantee.

In Short—America's Most Easily Sold Stoker!

"It Earns As It Burns"

Model A-4
Burning Capacity, 20 to 40 lbs.

You'd Better Decide RIGHT NOW to Get Complete STOKER-OLA Details AT ONCE

Advance Appliance Co., Inc.
808 S. Washington St. Peoria, Ill.

Association Activities . .

Indiana

The Sheet Metal and Warm Air Heating Contractors' Association of Indiana is sponsoring district meetings for the coming year as follows:

Fort Wayne, Friday, May 6
Lafayette, Friday, June 24
Indianapolis, Friday, July 29
Terre Haute, Friday, August 26
Vincennes, Friday, October 21
New Castle (Richmond District) Friday, December 2
Lafayette, February 3 and 4, 1939 (State Convention.)

Meetings are open to the sheet metal or furnace trades.

Louis Lehnen, President.

◆

Pennsylvania

The Sheet Metal Contractors' Association of Pennsylvania held a preliminary meeting on April 20 for the purpose of reviving the activities of the association. Approximately 30 men attended, representing the state from Easton to Erie. Pa.

It was the decision of the meeting to hold a state convention in Altoona on June 23 and 24 at the Hotel Penn Alto. A. J. Sabathne of Altoona was named general chairman.

M. F. Liebermann, Secretary.

◆

Milwaukee

The monthly meeting of the Milwaukee Master Sheet Metal, Heating, Ventilating and Air Conditioning Contractors Association of Milwaukee, Wisconsin, met on Monday, May 2, at Guild Hall, Republican Hotel. Sujects discussed were: telephone directory classified advertisements; name plates; constitution, by-laws; committee reports—legislative, membership, entertainment; and the picnic in July.

Attention was called to the newly created State-Wide Construction Industry Conference of Wisconsin. Wisconsin is protesting WPA usurpation of the construction industry. Members are requested to write both senators and the congressman of the member's district, urging that WPA rules and regulations be amended to the extent that construction work which would usually be done by the local communities, and paid for by local taxpayers, be done by the established competitive contract method, to insure economy, provide more employment to qualified construction mechanics, and protect the construction industry from destruction. They request the immediate revival and continuation of the Public Works Administration as an essential step toward the recovery of business.

Paul L. Biersach, Secretary.

◆

Cincinnati Stoker Association

The Greater Cincinnati Stoker Association has been trying for the past several months to formulate a standardization program on "Free Service and Parts Guarantee." A survey reveals various methods.

In some instances manufacturers offer one year free service with one year guarantee on parts. Others are offering ninety days free service with two-year guarantee on parts, while the set up for the majority is ninety-day free service with one year guarantee on parts.

While I believe it is the wish of every member of this association to have a standardized program set forth to work from, they cannot rightfully carry out this standardization plan locally, due to the fact that all advertising matter, agreement forms and guarantees furnished by the manufacturer they represent, carry these special terms already printed on these special forms

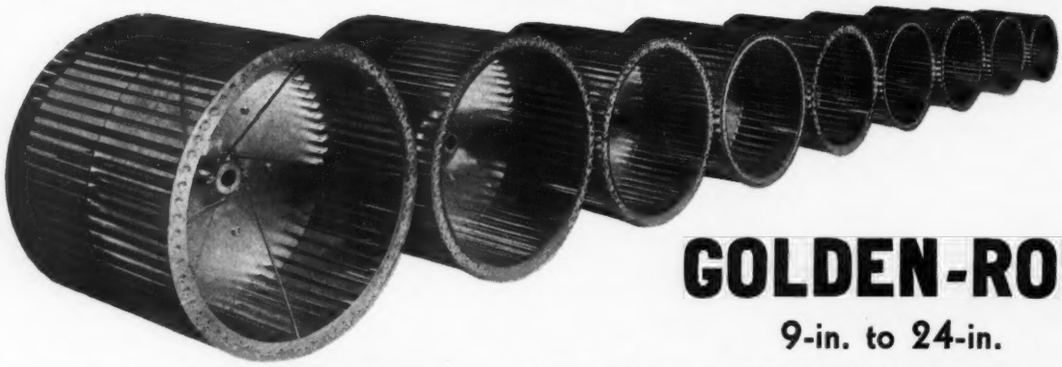
This association would like to go on record as recommending the following:

Ninety Day Free Service
One Year Guarantee on Parts.

The Cincinnati Association is asking the Stoker Manufacturers Association to ascertain the reaction to this recommendation.

B. J. Toerner, Secretary.

NOW —a Better-Designed, Finer Constructed
MULTIPLE-BLADE BLOWER-WHEEL



GOLDEN-ROD
9-in. to 24-in.

PACKAGE TYPE BLOWERS

Here is one of several Golden Rod blowers, featured with unusual silence, efficient blower wheel, durability, maximum air delivery, ease of installation and better accessibility. Large filter area. Capacities, 1,000 to 4,000 CFM. Ask about this.

Here is the improved GOLDEN ROD Multi-Blade Blower Wheel. Built in a wide variety of sizes. All steel, electrically welded construction. Center disc design. Perfectly balanced. Extra quiet running. One of the most efficient on the market. Built complete in our plant.

ORDER 1 OR ANY QUANTITY! A finely made blower wheel at a moderate price. Get quotations.

ORDER FROM YOUR JOBBER OR WRITE!

See your nearest distributor for complete information on Golden Rod complete Conditioners and Blowers—or blower wheels. Or, write us for full details and prices.

F. JADEN MFG. CO., HASTINGS, NEBR.

WRITE NOW

F. Jaden Mfg. Co.
Hastings, Nebr.

Please send me information about your
BLOWER WHEELS BLOWERS
AIR CONDITIONERS

NAME .....

ADDRESS .....

With the Manufacturers . .

New Trade Prices

International Heater Company, 1933 Wentworth Avenue, Chicago, announces a new price list, effective April 1.

◆

C. P. Culbert

C. P. Culbert has just been appointed vice president and general sales manager of the Nu-Way Corporation, Rock Island, Ill.

◆

Niagara Opens Cleveland Branch

The Niagara Machine & Tool Works, Buffalo, N. Y., announces the opening of a new factory branch office in the Leader Building, Cleveland, Ohio. J. K. FitzGerald is manager.

◆

Stoker-Fired Directaire Approved

Fitzgibbons Boiler Company, Inc., New York City, announces the approval of their Fitzgibbons Directaire conditioner for stoker firing by Anthracite Industries Incorporated Laboratory at Primos, Delaware County, Pa.

◆

Century Has New Office and Factory

Century Engineering Corporation, 213 Fourth Avenue, Cedar Rapids, Iowa, has a new 7-story office and factory building with the latest equipment for increasing efficiency,

complete facilities for research and product development, for skilled engineering, and for thorough and accurate testing and for efficient production.

There are over 85,000 square feet of floor space all devoted to the development and manufacturing of Century automatic oil heating equipment.

◆

Lincoln Subsidiary in Australia

J. F. Lincoln, President, The Lincoln Electric Company, manufacturers of arc welding equipment, Cleveland, announces establishment of a manufacturing subsidiary to be called Lincoln Electric Company (Australia) Pty., Ltd., at Sydney, Australia. A suitable factory has already been purchased and arc welding equipment manufacturing operations will begin in a year's time.

◆

D. E. McCabe

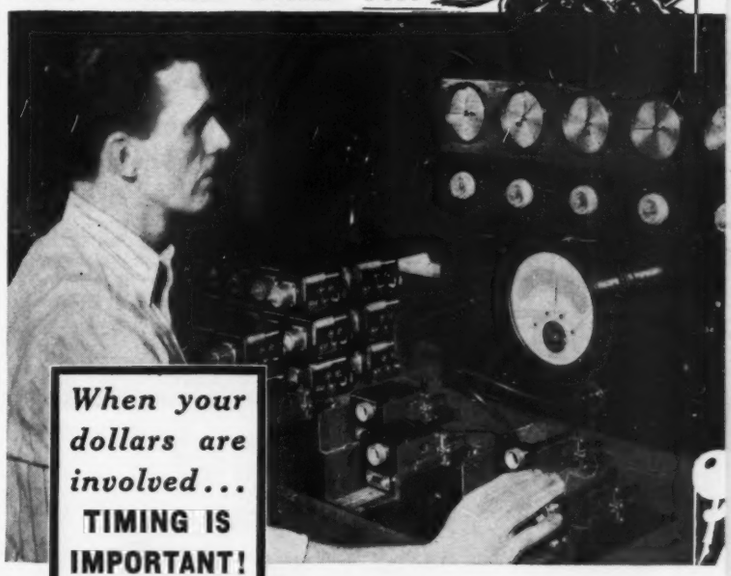
D. E. McCabe, 73, long associated with the plumbing and heating industry, died at his home in Toluca, Illinois, on March 24.

When a young man Mr. McCabe was employed by the U. S. Heater Company of Chicago for a short period, and then with the International Heater Co. as sales manager of the Chicago Branch, whom he served for 29 years.

For many years he was an active member of the Western Trade Golf Association, the Chicago Athletic Club and the Calumet Country Club.

Mr. McCabe is survived by his widow.

Derby Winners
ARE TIMED LIKE THIS



Whether you place two dollars on a derby favorite, or invest thousands in engineering service, accurate timing determines your gain or loss. The element of human error must be eliminated.

Trip-out timing of electric controls incorporating the safety feature of heat-type circuit breakers, must fall within very close limits—bordered on one side by maximum safety—on the other by minimum service calls.

To assure absolute accuracy, every Penn control incorporating heat-type circuit breakers is factory adjusted and then tested by the most advanced type electric timing devices, which measure time in tenths of a second. Nothing is left to guess-work.

Thus users of Penn controls get maximum safety . . . installers are assured of a minimum of service calls and service expense. You can guarantee performance . . . accurately estimate profits on Penn-controlled installations. Specify Penn controls on your next job.

PENN ELECTRIC SWITCH CO.
GOSHEN, INDIANA

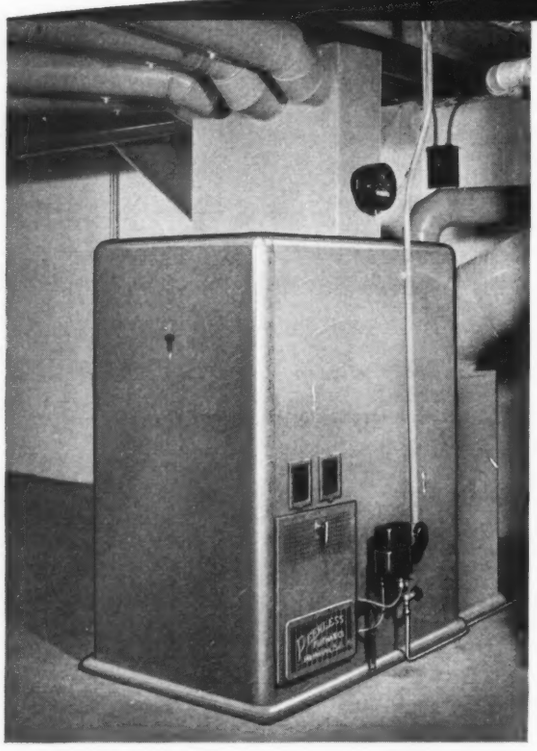
Branches, Factory Representatives and Distributors in all principal cities

PENN

COMFORT ZONE CONTROL means true comfort in the first four feet above the floor, plus Penn reliability, reputation, and extra sales appeal. Write for catalog.

TEMCLOCK TEMT

★ AMAZING NEW OIL OR GAS FURNACE HAS "EVERYTHING" CUTS COSTS IN HALF



SENSATIONAL SMALL HOME UNIT —TERRITORY GOING FAST

The new Peerless "ACE"—complete winter air conditioning unit with filters and blower, pictured above—is exactly what you have been looking for. Two "Blue Flame" ring-type oil burners—with pilot and automatic controls, developed by A. B. C. bring fuel costs within the range of coal or coke. Extremely efficient gas burner if desired. Grab this QUICK! Territory going fast. A demonstration means a sale. Here's your opportunity to MAKE MORE MONEY THIS SUMMER than you've ever made before. Write, wire or phone for prices and details of dealer proposition NOW —BEFORE YOUR TERRITORY IS GONE!

PEERLESS FOUNDRY COMPANY

PEERLESS FOUNDRY CO.
INDIANAPOLIS, INDIANA

Send illustrated literature about new ACE—and your dealer proposition at once.

Name .....

Address .....

With The Manufacturers . . .

B. J. McCarthy

International Heater Company, Utica, N. Y., announces that B. J. McCarthy will represent the company in Southern Illinois, with headquarters at Springfield, Illinois.

◆

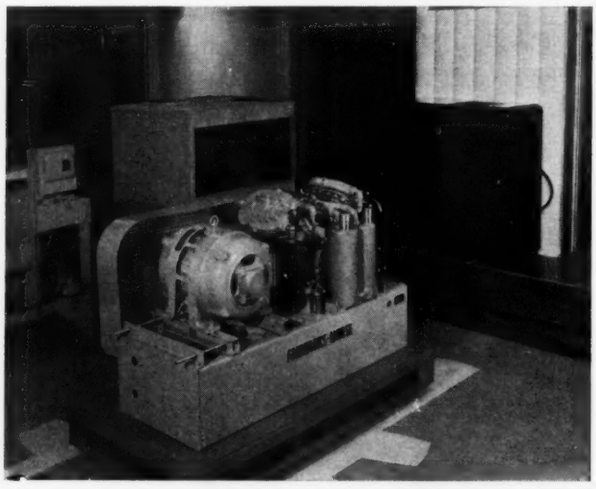
Advertising and Selling

"Advertising and Selling Through Business Publications," by Mabel Potter Hanford, was planned as a text book of value to publishers, advertisers and students interested in this type of media and concerned with establishing business paper advertising and publishing on a sound and effective basis. Harper & Brothers, publishers, New York City.

◆

Open Display Room

Fairbanks, Morse & Co. has announced the formal opening of its display room on the first floor of the modernized and renamed Fairbanks-Morse building at 600 S. Michigan Ave., Chicago. The picture herewith shows the corner of



the room devoted to the display of the company's air conditioning equipment. The company moved its general offices to this new location from 900 S. Wabash Ave., early in January. Executive, sales and departmental offices now occupy the first five floors of the building, totalling about 60,000 sq. ft. of floor space.

◆

Welding Society Awards

A board of awards, composed of H. L Whittemore, chairman, and Messrs. G. T. Horton and A. G. Oehler, was appointed recently by the executive committee of The American Welding Society, 33 West 39th Street, New York City, to have charge of selecting the recipient of the Lincoln Gold Medal for 1938. Following appointment, the board drafted regulations governing award of the medal which has been accepted by the Society for annual award. Copies of regulations are available.

◆

U. E. I. Engineering Staff Moves

E. P. Sorensen, president of Utilities Engineering Institute, 404 North Wells street, Chicago, announces the leasing of additional office space to provide for the expansion of its Engineering Department.

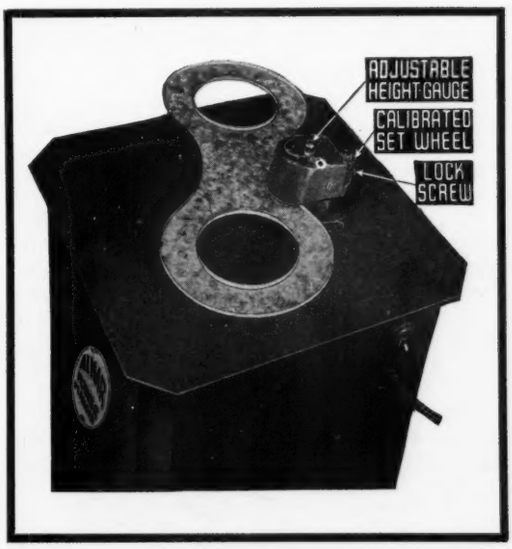
The Engineering Staff will now be segregated from other departments of the Institution enabling it to concentrate on engineering research and deal more efficiently with student problems.

Continuing its policy of personalized student instruction, the Institute has added three new instructors to its staff, permitting the handling of student problems with greater efficiency

THE ALMAR-BITTNER POWER FLANGER (PAT.)

NOW A MEMBER OF THE ALMAR LINE

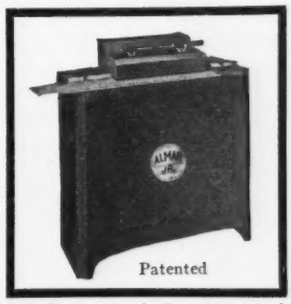
A FITTING COMPANION TO THE ALMAR CORNER LOCK FORMING MACHINE FOR FITTINGS



SPEED?
15 to 25 Feet per minute

CAPACITY?
16 gauge and lighter

IS FLANGE HEIGHT ADJUSTABLE?
Yes—1/8" to 3/8"



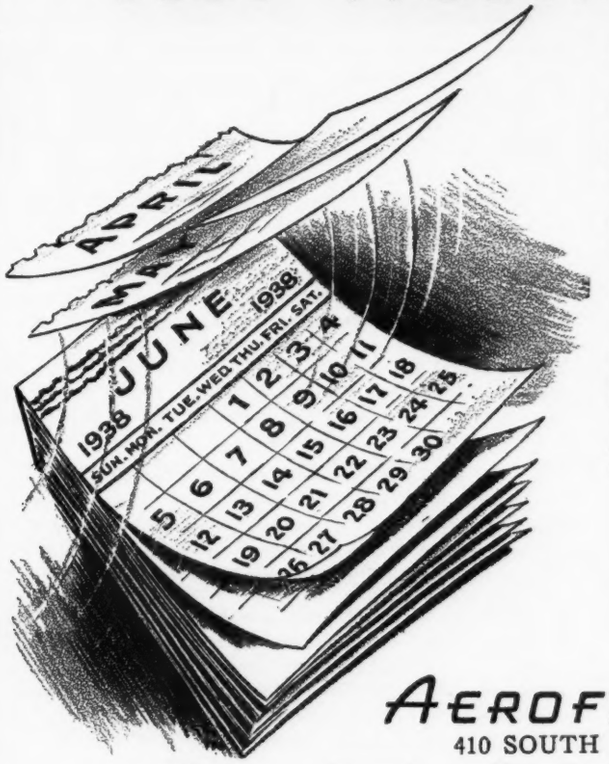
Almar Corner Lock Forming Machine.
3 sizes—16 to 30 gauge.

Write for prices and details—Almar-Bittner Power Flanger and Almar Corner Lock Forming Machines

LOWER YOUR SHOP AND FIELD FABRICATING COSTS WITH THE ALMAR LINE

564 W. WASHINGTON BLVD. **WARD MACHINERY COMPANY** CHICAGO, ILLINOIS

Hot Weather Ahead!



For Your Information —

Aerofin Cooling Surface has the following important advantages —

Direct Expansion Units with their patented centrifugal headers assuring rapid and equal distribution of refrigerant throughout —

Cleanable Tube Water Units with removable headers permitting easy cleaning of tube interiors where necessary — and —

Continuous Tube Water Units with positive counterflow of air and water —

All of which means lasting satisfaction to the user.

In addition to the above Aerofin's complete line of heating units for all temperatures and pressures, is further assurance that every requirement in the heating and cooling industry can be met.

Write to our home office or consult any of the district offices listed below for complete technical literature or consult them on your specific problems.

AEROFIN

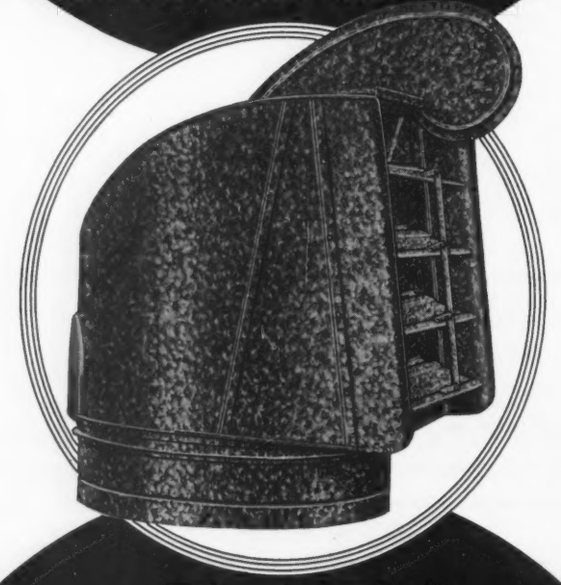
Heat-Exchange Surface

AEROFIN CORPORATION

410 SOUTH GEDDES STREET, SYRACUSE, N. Y.

Chicago • Detroit • New York • Philadelphia • Dallas • Atlanta

When Ventilation Conditions are *Tough*— Requirements *Exacting*— and Customers *Particular*— *Here's the answer for both the customer and YOU!*



The NEW **Swartwout ROTARY** *BALL BEARING* **VENTILATOR**

● Newly improved design and construction — greater capacity — more dependable than ever — pleasing, modern appearance — backed by a 27 year record of outstanding successful performance.

Attractive discount to Sheet Metal Contractors — write for prices and full information.

THE SWARTWOUT COMPANY
18615 EUCLID AVENUE, CLEVELAND, OHIO

With the Manufacturers . . .

Dux-Sulation in Cleveland

The Air Conditioning Supply Co., Cleveland distributor of Grant Wilson's Dux-Sulation, has moved into new and more spacious quarters at 4060 Superior Avenue.

◆

Frank Fillo

Frank Fillo, formerly with Minneapolis-Honeywell, has joined the White-Rodgers Electric Company, as sales engineer, and will make his headquarters at the factory. The company manufactures "solid liquid fill, hydraulic action" controls at 1209 Cass Avenue, St. Louis.

◆

Debothezat Moves Credit Department

DeBothezat Ventilating Equipment Division, American Machine and Metals, Inc., announces the removal of the credit and collection departments to Chicago, with headquarters at 35 Wacker Drive, East, from East Moline, Illinois. C. A. Force, credit manager, remains in charge.

◆

Shamblen Conducts School

The Shamblen Furnace Parts Company, of Pittsburgh, Pa., has just completed its third year winter air conditioning school. The term was nine consecutive Thursday evenings.

Subjects covered included the Standard Code, Mechanical Code, humidity, air circulations, controls and flues. Average attendance was fifty-eight.

The mechanical work was followed by a final session covering sales.

◆

Engineering School Attendance Growing

Sunbeam schools were held in Chicago, Cleveland, Atlanta, New York, St. Louis and Boston by The Fox Furnace Co., of Elyria, Ohio, during February and March. E. P. Hayes, general sales manager, believes the growing attendance at these schools is an indication of the increased appreciation on the part of the trade of the profit possibilities of the air conditioning business. The instruction given at these schools is based on the fundamentals of air conditioning and better installation methods.

◆

Gar Wood Educational Course

The air conditioning division of Gar Wood Industries, Inc., has launched a nation-wide educational course for Gar Wood air conditioning salesmen, Frank H. Dewey, general manager of the company's air conditioning division announced recently. The various subjects concerning the functions of air conditioning are being presented by mail each month in the form of a booklet entitled, Dewey Dials.

Besides acquainting the entire sales personnel with the facts and functions of air conditioning in general and its relation to winter residential automatic heating and air conditioning in particular, each course contains information on merchandising the company's air conditioning systems and products in a proper and effective way.

Now— GRAVITY REGISTERS AND INTAKES by TUTTLE & BAILEY

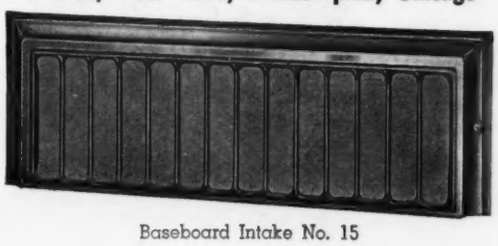
Baseboard Register No. 20

Now you can avail yourself of all the built-in quality of a Tuttle & Bailey product in every Register, Intake or Grille you buy. The new side wall and baseboard Gravity Registers and Intakes round out the most complete line in America of air conditioning and forced air Registers, Intakes and Grilles. All regular sizes in stock for immediate shipment. You don't have to wait for T & B goods! Have you received your copy of our new catalog? If not send now for catalog 38R.

TUTTLE & BAILEY, Inc.

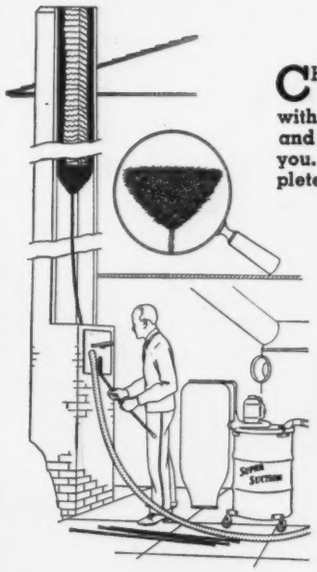
NEW BRITAIN, CONN.

Boston, New York, Philadelphia, Chicago



Baseboard Intake No. 15

Sells 20 Tons Of Castings and Many Replacement Furnaces . . .



CHIMNEY cleaning alone makes a money-saving hit with the home. No trick to do it, and is a big money-maker for you. Special chimney tools, complete, come with each Super Furnace Cleaner. Cone-shaped chimney brush, square pipe brush, 8 handle sections reaching 36 feet, shield to cover chimney hole, and crank to twist brush around any projection in chimney. The Super gets the soot as it falls. Cleans 'em quickly and easily from the basement — not the roof.

READ what one user writes us—name on request: "The Super Suction to my notion is the best cleaner you can buy. I've had mine 4 years and no repairs except new hose and new bag. We get from $5 to $7 for cleaning a plant heating 5 rooms and bath. Takes about 4 hours' time, one man, as we clean the flue, in and outside of all warm air pipes and cold air ducts. Also in and outside of furnace casing. That pays well.

"But the real profit from this machine is replacements and casting parts and new smoke pipes. Our first year netted us about 20 tons of castings and replacement furnaces which otherwise we would not have gotten."

Write for your Plan Book telling how to use a Super as he does, to make money by cleaning, still more money by selling furnace repairs, parts and replacements. Take a Super for 5 days' free trial, see for yourself what a sure-fire profit getter the Super really is.

USE THIS COUPON

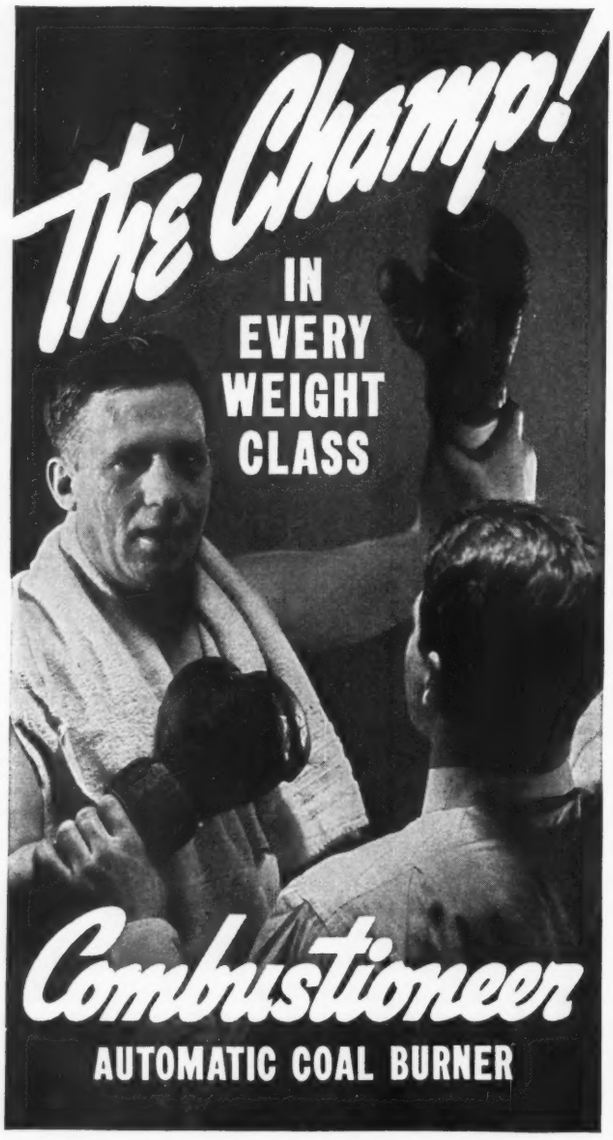
The National Super Service Company
1944 N. 13th Street, Toledo, Ohio

Send me the Plan Book and complete information about your free trial and the new low-priced Super.

Name .....

Street Address .....

City and State .....



In the field of Automatic Coal Heating, on the level now, what's Combustioneer got that makes it Champ in every weight class? Suppose Combustioneer does whittle down fuel costs—minimize smoke, soot, ashes, and human effort on every heating job, from tiny bungalow to huge factory! What's it got that puts cash in dealers' pockets? Well, Mister, it's this way! Combustioneer is a pioneer—it's been around a long time—doing a swell job in thousands of installations all over the world. Combustioneer's learned the angles—about the importance of precision-built manufacture, for instance. So Combustioneer has kept in fighting trim—stayed ahead of the bunch with exclusive construction and convenience features—a profit-making price and discount structure—proved sales plans—national advertising—say, if you want *the answers*, just write to Combustioneer, Springfield, Ohio.

Combustioneer
AUTOMATIC COAL BURNER
FOR HOMES, APARTMENTS AND FACTORIES
DIVISION OF THE STEEL PRODUCTS ENGINEERING CO.

News Items

Administration of Social Security

The Treasury Department, Washington, D. C., has issued a statement on "Fiscal Administration of the Social Security Act."

◆

Poughkeepsie Firm Moves

The Modern Automatic Heat Company, Poughkeepsie, New York, has moved from 569 Main Street to their new warehouse and offices at 14 Wood Lane, Poughkeepsie. Their associate company, Controlled Heat, Inc., will also be at the new location. C. Bertolette heads the company.

◆

The New Technical School

The site of the 62-year old Col. H. A. Montgomery residence at the northeast corner of Poplar and Bellevue, Memphis, Tenn., has been cleared for the Wm. R. Moore School of Technology—work started April 1 with completion in the autumn, 1938. Architects Walk C. Jones-Walk C. Jones Jr. of Memphis have prepared the plans. The building and equipment will cost $200,000. A million dollar fund from the estate of Wm. R. Moore, merchant prince of Memphis, will operate the eleven months day and night school.

Among the many technical subjects to be taught are sheet metal work, mechanical drawing, painting, electrical engineering, tool making, etc. Dr. J. L. Skinner, formerly of Augusta, Georgia, is director of instruction of the entire school. W. R. King of the National Bank of Commerce, Memphis, is president of the Board of Trustees.

◆

CIO Loses at Armco's Butler Plant

Hugh W. Wright, assistant to the Director of Personal Relations, the American Rolling Mill Co., Middletown, Ohio, reports that at the Butler, Pennsylvania, plant recently employees voted 1,243 to 402 against naming the SWOC their exclusive bargaining agent with 93 percent of the eligible voters voting. The vote was the climax of a long period of campaigning by the CIO to have its organization, the SWOC, become the exclusive bargaining agents for the Armco employees. The election was in charge of Charles T. Douds, regional director of the Sixth Division of the National Labor Relations Board, Russell R. Miller, field examiner, and Attorney Ben Jordan, Attorney Henry Shore, Attorney Frank Paone, and Examiners James Beech and Robert Williams of Pittsburgh.

◆

Obituary

Charles B. Rundell

Charles B. Rundell, 65, of the Rundell Sheet Metal Co., 115 E. Columbia Street, Fort Wayne, Indiana, and for a number of years district governor of the Sheet Metal and Warm Air Heating Contractors' Association of Indiana, passed away on April 7, following an illness of nearly a year. Mr. Rundell first started in the sheet metal business with the Staub Sheet Metal Company and after the retirement of Mr. Staub, the firm became known as Rissing and Rundell—later changed to Rundell Sheet Metal Company.

◆

William S. Bayley

William S. Bayley, a pioneer heating and plumbing contractor of Minneapolis, Minn., passed away recently in Los Angeles, Cal., at age of 85. He retired from business in Minneapolis in 1928.

◆

Clement Sauve

The death is reported of Clement Sauve, who was engaged in the sheet metal and plumbing business in Toppenish, Wash.

ANOTHER PEXTO PROFIT BUILDER

- TURNING
- BURRING
- WIRING
- ELBOW EDGING
- COLLAR EDGING

and

- FLANGING

You can handle MORE operations faster and better with this

TRULY UNIVERSAL

ROTARY COMBINATION MACHINE

First and second operation flanging rolls as illustrated above, heretofore supplied only on special order, are available from stock for this machine giving it added versatility of particular importance to shops handling modern air conditioning work, etc.

Furthermore, this is the only machine of its type embodying ALL of the following features making for long and economical performance.

Heavy one-piece frame. Solid steel, quiet running machine-cut gears. Gauge that can be used on both front and back of machine. Hardened steel rolls, keyed to shafts instead of threaded, and held by countersunk lock nuts, eliminating all danger of rolls turning off arbors. Forged steel crank for depressing top roll. Spring cushioned journal box and knurled lock nut for lower roll adjustment. Steel adjustable-throw drive crank. Distance between shaft centers—2 inches.

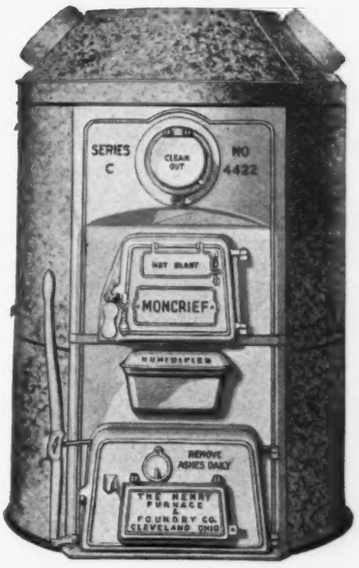
This is only one of many outstanding Pexto contributions to profitable sheet metal fabrication . . . machines and tools that can help you make more money on better work. Write us for current bulletins.

THE PECK, STOW & WILCOX COMPANY

Since 1785

Southington Connecticut

MONCRIEF



SIMPLIFIES YOUR SELLING

The completeness of the Moncrief line gives you a big sales advantage, because one Moncrief job helps sell every other kind of installation. The name Moncrief on warm air furnace and on winter air conditioner stands alike for modern design,—and high quality materials and workmanship; so that one Moncrief sale paves the way for another.

Look to Moncrief for all your needs in furnaces, winter air conditioners and pipe and fittings. You will be assured of biggest values backed by superior service.

THE HENRY FURNACE & FOUNDRY CO.
3473 E. 49th St., Cleveland, Ohio

Manufacturer of

- Cast and Steel Furnaces
- Winter Air Conditioners for Gas, Coal and Oil
- Pipe, Fittings and Accessories for both gravity and air conditioning systems
- Automatic Humidifiers
- Moncrief Blower-Filter Units

News Items . . . . . .

Best Atmospheric Condtions

Pittsburgh, Pa.—Experiments are being undertaken at the Magee Hospital here to determine the best atmospheric conditions for all types of operations by a group of distinguished medical men and air conditioning engineers under the direction of Dr. R. R. Huggins, dean of the University of Pittsburgh Medical School, and F. C. Houghten, research director of the American Society of Heating and Ventilating Engineers.

Equipment for the experiments, which are to extend over a period of years, is now being installed and the project will also cover air conditioning in recovery rooms.

◆

Brandeis Machinery and Supply Co., Brook and Warnock St., Louisville, Kentucky, distributors are installing Carrier air conditioning equipment in the four operating rooms of the Kentucky Baptist Hospital. It is also installing Carrier equipment for the Bond Clothing Co. and the Maude Muller Candy Shop. W. J. Davis is chief engineer of the air conditioning division of Brandeis.

◆

Wuest Bros., 930 Hill St., Louisville, Kentucky, was founded thirty years ago in a small shop at Arcade Ave. and Taylor by W. R. and J. H. Wuest. Wuest Bros. now have under their supervision the Sheetmetal Product and Metal Equipment Co. and through these channels supply almost any type of metal stamping or sheet metal interior decorative work. They have a fully equipped shop with die machines. They manufacture a portable table much used in hospitals and homes, also for typewriters and books. Their Metal Equipment Co. manufactures much steel merchandising equipment for stores, automobile concerns etc. They have an engineer in expert decorative work in metal.

The Sumner Construction Company of Nashville has been awarded the contract for remodeling the offices of the Governor and Secretary of State, located on the east side of the Capitol, on Capitol Hill. Structural changes to building will be minor. It is of Tennessee limestone and in fair condition, though erected during the administration of Andrew Johnson, later president of the United States. Slave labor was used extensively. Wm. Strickland, a Philadelphia architect designed it and is buried on the portico in one of the stone walls.

◆

Woodson and Bozeman, Inc., Memphis, Tennessee, have moved to 482 Union Avenue at Southern RR crossing with office, shops and salesrooms in air conditioning, machinery and insulating materials. Showrooms, drafting rooms and shop are on first floor while the second floor is a warehouse.

◆

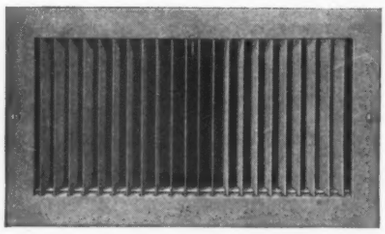
Milnor Air Conditioning Company, Cincinnati, Ohio, newly organized, has headquarters at the northwest corner of Ninth and Sycamore Sts. A lease was taken on first floor and basement space, and an additional storage space. The firm will have a fine show room and executive offices on first floor and a similar space in basement for engineering, drafting and service departments. Arthur Radtke who has been associated with Milnor for many years in the commercial field is active in the management of the new firm.

◆

J. H. Mendenhall did the sheet metal work and Luppen & Hawley installed heating and air conditioning in the new Sutter Maternity Hospital which was recently opened to the public in Sacramento. The structure is the first maternity hospital in the United States to be fully air conditioned and the third hospital in the nation to be so equipped.

Two separate air conditioning systems were installed, one for the delivery suite and nurseries which maintains temperature at 85 degrees with no recirculation of air and the second for other parts of the building which maintains the temperature at 75 to 80 degrees with partial recirculation of air. Capacity of the hospital is 52 mothers and 52 babies.

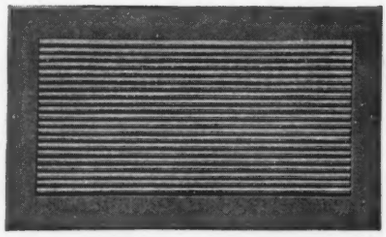
A Line That Covers ALL *Register Needs!*



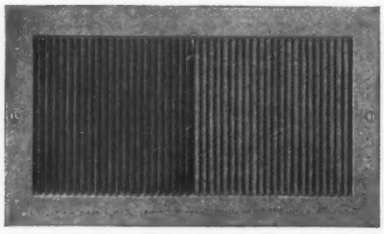
No. 8130—Dura-Flo Register

- A wide choice of models for gravity and air conditioning purposes—plus 15 grille faces.
- Registers and intakes for floor, baseboard, or wall—band or slide frame, standard or narrow mesh.
- Air directing types, single or multiple directions, for any desired effect, fixed or adjustable blades.
- A *Complete Line* that fills *any* requirements as to style, size or finish.

New Catalog 38 shows all latest Auer Models—get your copy now!

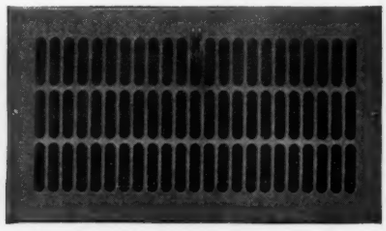


No. 9000—Fin-Flo Register



No. 9030—Fin-Flo Register

Dura Bilt Intake



No. 6032—Classic Register

THE AUER REGISTER COMPANY, 3608 PAYNE AVENUE, CLEVELAND, OHIO

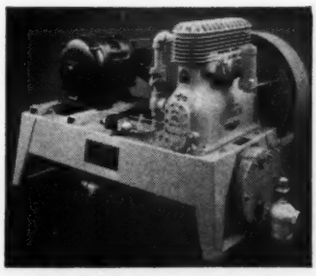
AUER DISTINCTIVE REGISTERS & GRILLES For Air Conditioning *and* Gravity

YOUR BEST ADVERTISING IS FREE

WHEN YOU INSTALL BAKER SYSTEM AIR CONDITIONING

● Your best advertising . . . word-of-mouth . . . does an overtime job when you install BAKER SYSTEM Air Conditioning because your customers tell their friends about the added economy and dependability of your BAKER installation.

● BAKER SYSTEM Air Conditioning, with the largest range of sizes on the market, can be readily and easily adapted to fit the requirements of each particular job. For franchise details, write to the factory.



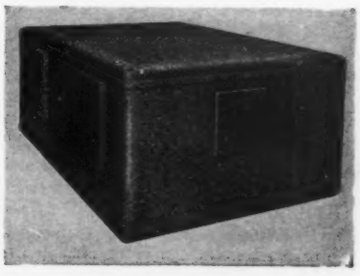
BAKER

ICE MACHINE COMPANY, INC.

1553 EVANS ST., OMAHA, NEBR.

Branch Factories: Fort Worth, Los Angeles, Seattle
Eastern Sales: New York
Central Sales: Chicago
Sales and Service in All Principal Cities

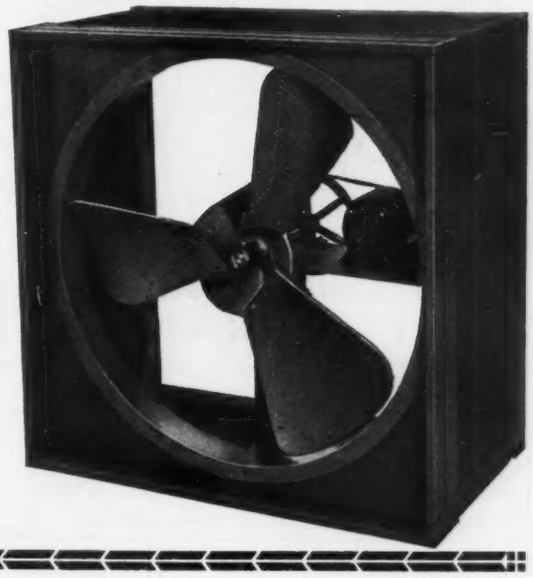
AUTHORITY ON MECHANICAL COOLING FOR OVER 30 YEARS



BIG PROFITS
for YOU in Summer Cooling!
NITEAIR

Niteair Attic Fans are surprisingly low in price! Every home owner is a live wire prospect for this efficient method of cooling. And, YOU can make a BIG PROFIT on every installation! The season is here . . . don't delay—write now for complete details.

Just off the press . . . a complete new catalog on Niteair Fans. Your copy will be mailed immediately on receipt of your request.



Complete With All Accessories

- **A complete range of sizes for every requirement—30-inches to 42-inches.**
- **Niteair capacities—5,000 to 11,000 cubic feet per minute.**
- **Automatic or stationary louvers.**
- **Free area grilles of sufficient face area.**
- **Automatic control . . . requires no current . . . never needs winding.**
- **Suction box.**
- **Quickly and easily installed.**

The Lau Blower Company
Dayton, Ohio

New Incorporations

D. R. Monro & Son have engaged in the heating and ventilating equipment business at 300 Failing Building, Portland, Ore.

◆

The Builders Sheet Metal Works has been established at 1530 Butler avenue, West Los Angeles, Cal., under the management of Clifford Otis Williams.

◆

The Paramount Roofing & Sheet Metal Works has engaged in business at 3512 S. E. Hawthorne, in Portland, Ore.

◆

The A. O. Petersen Sheet Metal Works has engaged in business at 1026 North Larabee street, in Portland, Ore.

◆

The Vack Industries has engaged in the manufacture of portable oil heaters at 1905 Third street, Seattle, Wash.

◆

Thomas E. Sanders has engaged in the heating business at 210 South Harwood, Dallas, Tex.

◆

The Link Sheet Metal Shop has engaged in business at 22 Ocean avenue, San Francisco, Cal.

◆

The Pioneer Iron & Metal Co. has engaged in business at 1116 West Pierce street, in Milwaukee, Wis.

◆

The Metal Craft Manufacturing Co. has engaged in business at 210 West Washington boulevard, under the management of S. S. Bernstein.

◆

The Builders Sheet Metal Works has been established at 1530 Butler avenue, West Los Angeles, Cal., under the management of Clifford Otis Williams.

◆

The Architectural Metal Works is the style of a firm which has engaged in business at 1667 East 23rd street, Los Angeles, Cal., the members of which are Joe Friedman and Philip Friedman.

The Bay View Sheet Metal Works has engaged in business at 4901 Third street, in San Francisco, Cal.

◆

Heating, Air Conditioning, Inc., has been chartered in Seattle, Wash., by P. H. Watt, D. E. Douglas, George A. Stabler, and others.

◆

The Air Conditioning Sales Co. has been incorporated in San Francisco, Cal., with a capital stock of $50,000, by George A. Jacques, C. L. Crisp and B. Von Ende.

◆

The Natural Gas Heating Engineers, Inc., has been chartered at 14015 Woodrow Wilson avenue, Detroit, Mich., with a capital of $10,000.

◆

Brusco Manufacturing & Sales Co. has been incorporated to engage in the welding and soldering equipment business at 1444 Webster avenue, Oakland, Cal., by Louis H. Sparber, 1331 Grand avenue, Piedmont; Harry R. Browne, 916 Grosvenor, and F. J. Brunckorst, 5655 Miles avenue, both of Oakland.

◆

The Econolite Products Corporation has been chartered to engage in heating and air conditioning business at 18306 Woodward avenue, Detroit, Mich., with a capital stock of $5,000.

◆

William Thompson has engaged in furnace and sheet metal work at 742 N. E. 28th street, Portland, Ore.

◆

William Padgett has opened a body and fender shop in Elma, Wash.

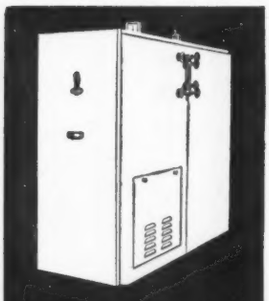
◆

New Location or Ownership

Frank West has purchased the metal working tools and equipment at 4724 Ballard avenue, Seattle, Wash., from Johnnie Wiest.

◆

The Dallas Roofing & Sheet Metal Co., of Dallas, Tex., has moved from 1337 Rose avenue to 221 East Colorado.



..You can get it!

AND THE WAY IS EASY

Among your customers there is Oil Burner Business . . . Cash in with a Branford franchise

Branford Boiler Burner Unit—All Capacities

Branford Model F

Branford Models A and E

COMPLETE LINE FOR ALL REQUIREMENTS

With a Branford franchise, extra business on oil burners comes your way — you supply the burner: not your competitor. Branford arranges for the survey, installation and service, with cash payments immediately upon completion of the job. Cash in on this helpful plan now —you can easily profit with a burner which is outstanding in quality made by a responsible, nationally known manufacturer of the highest reputation. Send the coupon for full details.

WHAT IS THIS PROPOSITION?

MALLEABLE IRON FITTINGS CO.
DEPT. 42, BRANFORD, CONN.

Gentlemen:

Please send along complete information on the Branford franchise.

Name .....

Address .....

BRANFORD

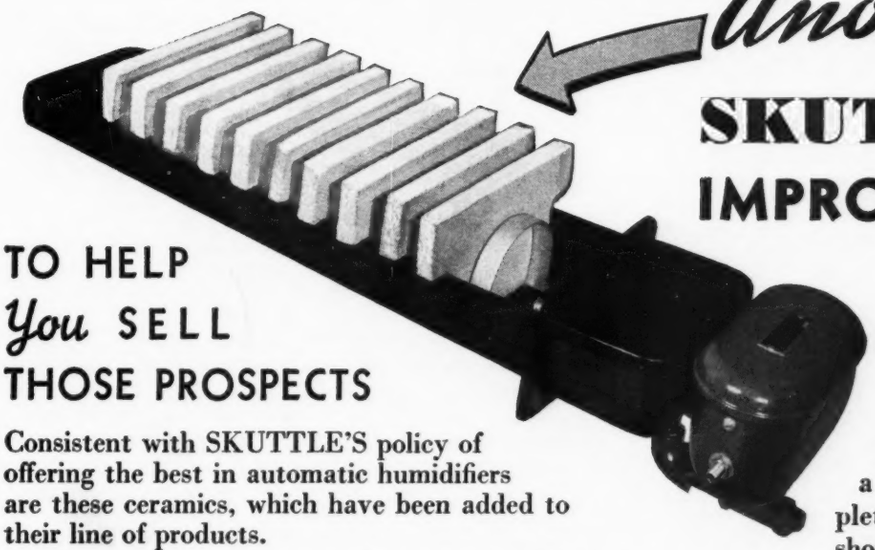
OIL BURNERS

FIFTEENTH YEAR

MALLEABLE IRON FITTINGS CO.

Serving the Heating Industry for 74 Years

DEPT. 42 BRANFORD, CONN.



Another SKUTTLE IMPROVEMENT!

TO HELP *You* SELL THOSE PROSPECTS

Consistent with SKUTTLE'S policy of offering the best in automatic humidifiers are these ceramics, which have been added to their line of products.

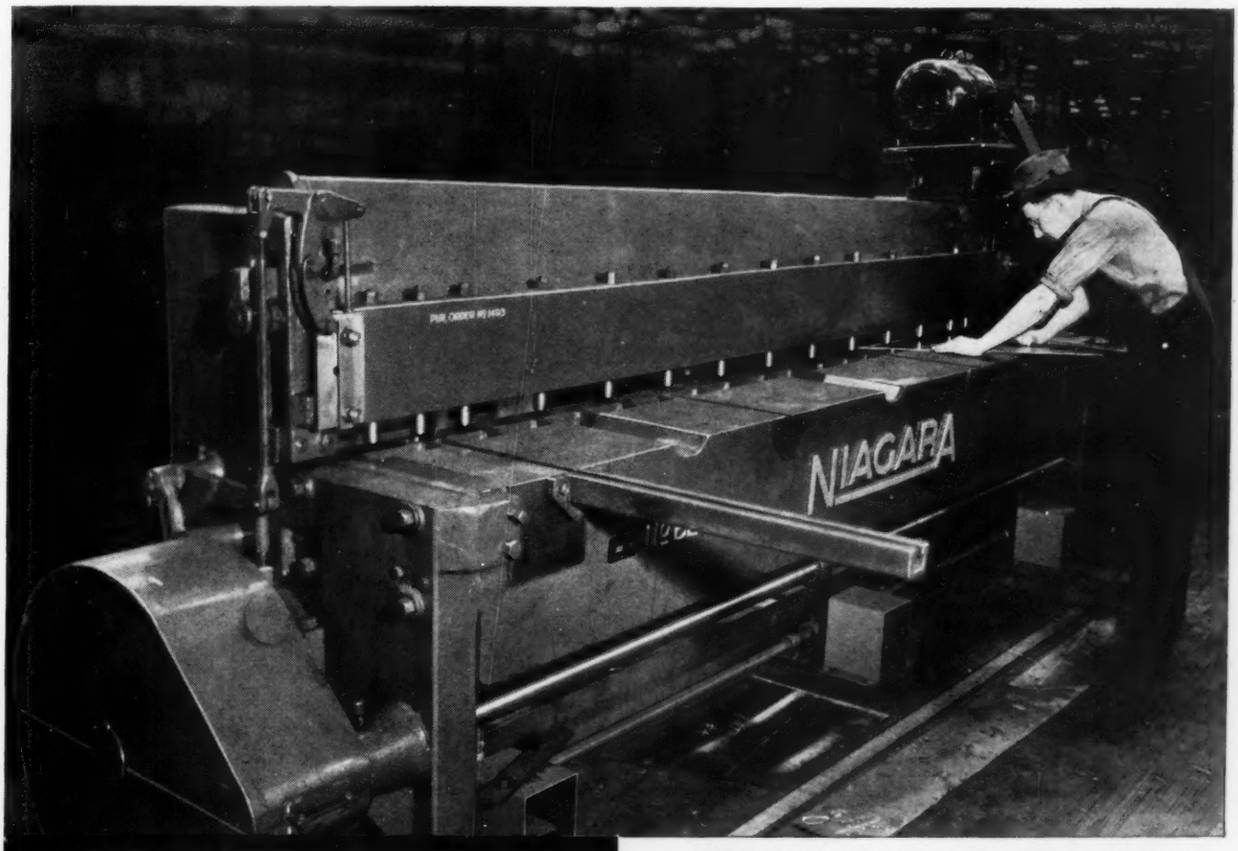
These ceramics are large "pored" and well separated with wide spacers to give the greatest efficiency in moisture distribution thoughout the home. You will find that here is another talking point to clinch that humidifier sale.

Dealers who are looking for a profit making line of completely automatic humidifiers shouldn't fail to inquire about the SKUTTLE line right now!

(The ceramics are optional with all units.)

WRITE TODAY FOR Skuttle INFORMATION

J. L. SKUTTLE COMPANY — AUTOMATIC HUMIDIFIERS — 999 FRANKLIN ST., DETROIT, MICH.



NIAGARA MACHINE & TOOL WORKS
637-697 Northland Avenue, Buffalo, N. Y.

SERIES BL POWER SQUARING SHEARS
10 Gage Capacity in 6, 8 and 10 Ft.; 12 Gage in 11 and 12 Ft.
Write for Bulletins on Complete Line of Machines and Tools.

Here's Comfort for BOTH . . . and good profit for you

RIGHT in your own neighborhood, many occupants of two-apartment dwellings are worrying through the winter in discomfort because of the difficulty of getting dependably uniform heat.

There's real comfort for both and a lot of profit for you in the installation of the Cook Zone Control System. It will do the job right. Provide the comfort of automatically controlled heat. Operate efficiently and economically. And win for you a host of friends whose appreciation of a good job will lead to new business.

Many old installations need this improvement now and new jobs can be installed right in the first place with the Cook Zone Control System. It's worth your while to write today for complete information.

COOK CONTROLS

THERMOSTATS—FURNACE LIMIT CONTROLS
ZONE CONTROLS—BLOWER CONTROLS

COOK ELECTRIC CO.

2674 Southport Ave. CHICAGO

New Incorporations

The Sheet Metal Supply Company has been incorporated in Milwaukee, Wis., by A. A. Mayer, Fred R. Wright and Helen Gehrman, and is located at 3221 North 31st Street.

◆

The W. J. Phillips Company, Incorporated, has been chartered in Detroit, Michigan, with a capital of $5,000, to engage in the heating business, and is located at 1165 W. Warren Avenue.

◆

The Wister Plumbing & Heating Company has been formed at 1212 Neptune Street, Wilmington, California, by J. Wister and H. H. Wister.

◆

The Air-O-Matic Heat Control Co. has engaged in the heat control equipment business at 2602 S. E. Grand avenue, Portland, Ore., under management of Virgil L. Wood.

◆

Robert Wasson has opened a sheet metal shop on High Street in Delano, California.

◆

New Location or Ownership

The Brice Gaston Heating Co., Dallas, Tex., has moved from 2821 to 2918 Live Oak street.

◆

Walter Cook, 3410½ Parry street, Dallas, Tex., has sold out to the Dallas Sheet Metal Works, 3308 Swiss avenue, Dallas.

◆

Fred J. Schuster has sold his half interest in the firm of Kieszling & Schuster, owners of the Twin City Sheet Metal Works, Chehalis, Wash., to Jerry E. Kieszling.

◆

The Apex Sheet Metal Works, Seattle, Wash., has filed a certificate of dissolution.

◆

R. Casper has purchased a half interest in the Art Craft Metal Specialty Co., 14 Valencia street, San Francisco, Cal.

◆

Jack Bellah, salesman-engineer, has become associated with George E. Wilson of the Wilson Sheet Metal Works, Bakersfield, Calif., and will direct the air-conditioning end of Wilson's business and take charge of sales.

◆

New or Remodeled Shops

Building permit has been issued for construction of a sheet metal shop at 5761 West Jefferson boulevard, Los Angeles, Cal., for Rachel Schlom. It will cover an area of 40 x 50 feet and will cost about $2,000.

◆

Nels Nelson, manager of the Barrett Hardware Store, Barrett, Minn., has been remodeling the store and now has a fine tin shop in the basement.

◆

The Dixie Metal Products Company, 14th Avenue and 13th Street North, Bessemer, Alabama, will move its plant now located at 1000 North 28th Street, Birmingham, Alabama, to Bessemer, and will enlarge.

◆

The Aurora Metal Company, of Aurora, Illinois, is adding another factory building to its plant.

◆

A $1,500 addition is being built to the tinsmith shop of S. Coutin, 3168 Wabash Avenue, Los Angeles, California.

◆

Building permit has been issued for construction of a sheet metal shop, at 3214-3218 Miles avenue, Los Angeles, Calif., for McHale Manufacturing Company, of 8548 South Broadway, that city. The new factory will cover an area of 40x72 feet, and will cost $5000.

Appliance Makers:

When the BURNER

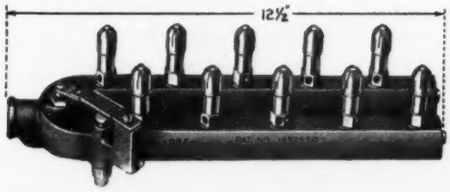
Is the Burning Question—

ask BARBER!

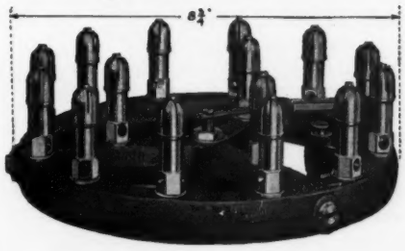
OVER 20 years' experience in the development and manufacture of burner units for all types of gas-burning appliances and equipment enables this Company to give *expert service* on any burner problem. The burner is the heart of the appliance. Our engineering and laboratory facilities make certain a burner unit *correctly* designed for your *specific* needs. The unique Barber Jet, together with other exclusive Barber principles, attains a flame temperature of 2000° F. on atmospheric pressure, with perfect combustion on every type of gas, including Butane.

Why nurse your own burner "headaches"? We welcome the opportunity to work with you in perfecting your burner unit and facilitating the sale of your product. If it's a gas burner job—*let Barber do it!*

Avail yourself of the complete and improved line of Barber Burner units, gas pressure regulators, and controls. Write for latest catalog and price list.

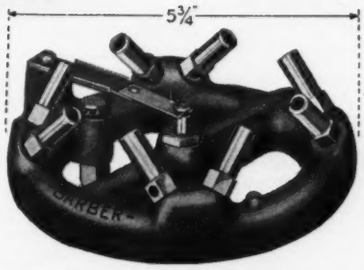


No. C. U.-90 Barber Burner with Safety Pilot



No. C. P.-150 Burner with Safety Pilot

No. S. P.-15 Barber Burner with Safety Pilot



We are Gas Burner Specialists and offer you the facilities of our Engineering Department and Laboratory on your Gas Burner Problems.

THE BARBER GAS BURNER CO.
3704 Superior Ave., Cleveland, Ohio

Address Michigan inquiries to
The Barber Gas Burner Company of Michigan
4475 Cass Ave., Detroit, Michigan

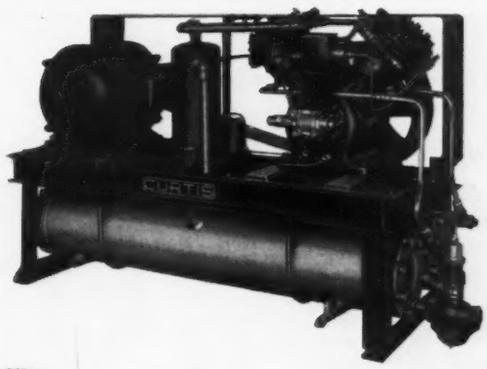
BARBER *Automatic* JET GAS BURNERS

● **for Warm Air Furnaces** ●
Steam and Hot Water Boilers
and Numerous Other Heating Appliances

Specify

CURTIS

for Protection



PROTECT YOUR INTERESTS and those of your customer by making reliability your first consideration in selecting a condensing unit for any air conditioning need—and CURTIS means reliability. For Curtis units are built to deliver years of dependable, trouble-free service and real operating economy under all conditions.

Long life and low upkeep cost, together with highest efficiency are characteristic of every Curtis unit. Curtis engineering created the exclusive "Centro-Ring" method of positive pressure lubrication. Curtis design includes Timken Tapered Roller Main Bearings, water jacketed compressor heads and cylinders, drop forged heat-treated crankshafts and connecting rods, balanced sylphon bellows seal.

There is a Curtis model for every air conditioning and refrigeration requirement, from 1/6 to 30 h.p., air and water cooled. Counter flow, cleanable shell and tube, and evaporative condenser models are available.

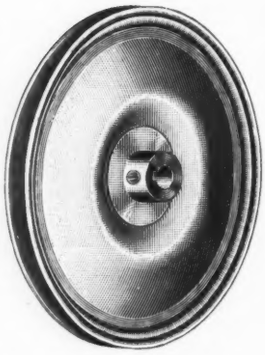
The quality and precision with which every Curtis unit is built is the result of 84 years of successful manufacturing experience—including 44 years of specialization in building fine compressors. The result is *reliability*—a product you can sell and recommend in full confidence.

Write today for new Curtis folder on Air Conditioning.

CURTIS REFRIGERATING MACHINE CO.
Division of Curtis Manufacturing Company
1946 Kienlen Avenue, Saint Louis, Missouri

CURTIS

MAUREY
STEEL V-PULLEYS
Specially Designed for High Efficiency Operation with STOKERS, BLOWERS, FANS, REFRIGERATION, AIR CONDITIONING and Other Domestic Units



Balanced, true running and quiet at all speeds. Built to give long trouble-free service under severest use. Made with heavy rolled steel edges and SOLID STEEL or malleable iron hubs, machined. Carried in stock for "A" and "B" belts, in a wide variety of sizes. With DOUBLE GROOVE as well as single groove.

No Die Cast Hubs Used in MAUREY Pulleys.

MAUREY Variable Pitch Diameter Pulleys

Single Groove

Solid steel construction. Adjustment permits speed variation of as much as 30%. Designed for Air Conditioning Units. Solid steel — not die cast. Made in 4 sizes, 3¼" to 4½ inches in diameter.

Double Groove

MAUREY MANUFACTURING CORP.
Wabash at 29th Chicago, Ill.

The "LAST WORD" in Damper Regulators

The consensus of opinion among hundreds who have seen or used the new "YOUNG" Valcalox Damper Regulator is that it is the LAST WORD. There is nothing else like it—nothing that will do all it does. The 21 serrations on dial and base POSITIVELY prevent slipping. There are 16 Points of Superiority in this new outstanding and revolutionary Damper Regulator. All we ask is that you TRY THEM ONCE. We know they will end your regulator troubles. USE ON YOUR NEXT JOB. ASK YOUR JOBBER.

Try Them ONCE

Patented
Pat. Pending

5/16" square rod Regulators are 16c each —with bearings, rivets, and screws, 22c each. Net trade prices. Also made in ⅜" size. Come packed twelve in a box with one wrench.

16¢ and 22¢ each

Ask Your Jobber or Write
YOUNG REGULATOR CO.
4500 Euclid Avenue Cleveland, Ohio

New Literature . . . .

For your convenience in obtaining copies of new Literature, use the coupon on page 94.

194—Refractories and Insulations

Refractory & Insulation Corporation, 381 Fourth Avenue, New York City, has just issued Bulletin OB 91 on R & I combustion chambers, refractories and insulations for domestic and commercial oil burner installations. The bulletin contains complete information on and instructions for the use of every product of such nature required in installation work.

◆

195—Centripeller Attic Fan

Paul R. Jordan & Company, 631 S. Delaware, Indianapolis, Indiana, is distributing a catalog covering the Jordan "Aero"-Line roof ventilators. There are two mimeographed pages of diagrams of the Jordan Centripeller attic fan, two pages of engineering information on residence cooling and a table of capacities and prices.

◆

196—Multi-Range Arc Welders

Hobart Brothers, Hobart Square, Troy, Ohio, is distributing a new bulletin covering their new model "Multi-Range" arc welders. The Multi-Range dual control provides 10 main current ranges with 100 intermediate steps of volt-amphere adjustment—1,000 combinations of voltage and current.

◆

197—J-M Heating Products

Johns-Manville, 22 East Fortieth Street, New York, is distributing a 16-page catalog of their products for the plumbing and heating industry. Of interest to the heating industry is their pipe covering, sheets and magnesia blocks and transite flue pipe.

◆

198—Rock Wool Insulation

Baldwin-Hill Co., 527 Klagg Avenue, Trenton, N. J., manufacturers of Baldwin Hill Rock Wool home insulation, announces an eight page booklet, size 8½x11 inches, presenting the story of Rock Wool, its development and application to new home construction and installation in existing homes.

◆

199—Ideal Insulation

The Hinde & Dauch Paper Company, Sandusky, Ohio, is distributing an envelope stuffer with space for dealer imprint entitled "Warm in the Winter—Cool in the Summer." Ideal insulation is a semi-rigid material fabricated from sheets of extremely thin, hard finished kraft paper and containing a multiplicity of cells which confine still air.

◆

200—Hydraulic Temperature Control

White-Rodgers Electric Company, 1209 Cass Avenue, St. Louis, is distributing a looseleaf portfolio covering their controls. With the exception of the room thermostat, all the controls in the portfolio employ the White-Rodgers "hydraulic action" principle. The makers claim remarkably close differentials using a "solid liquid charge," an element extremely sensitive to temperature changes and employing the positive principle of hydraulic action.

◆

201—Fire Prevention Booklet

The Linde Air Products Company, 205 East 42nd Street New York City, has just published a new booklet entitled "Preventing Welding and Cutting Fires," for those interested in welding or cutting operations.

The booklet is an important part of the nation-wide program to promote safe practices among the users of industrial equipment. It includes safe and sure rules to follow for preventing the possibility of welding or cutting fires, as well as other pertinent information.

Oil-n-Aire

WORLD'S MOST BEAUTIFUL

OIL BURNER

1 - NEEDS LEAST SERVICING

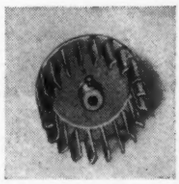
2 - EASIEST TO SERVICE

Here's the burner to incorporate with your heating equipment — Oil-n-Aire. Outstanding performance . . . striking beauty . . . and quality in keeping with the finest heating and air conditioning equipment of today. Gives you tomorrow's features today:

1. Precision machined throughout.
2. Removal of one screw gives access to electrical assembly. Blast tubes, fan, fuel pump, motor easily removed. Clean strainer in five minutes.
3. Extra weight eliminates vibration. Balanced three-point mountings.
4. Direct contact electrodes—no high tension leads.
5. Convertibility — interchangeable fans and blast tubes. Capacity 1-3 or 2-6½ gal. per hour. Two burners in one.

GET the FACTS on Oil-n-Aire for more and easier sales.

EQUIPPED with ALDRICH Self-Cleaning FAN and New A-C "Fuel-Pak" FUEL UNIT



Aldrich self-cleaning fan —can't collect dirt and change air adjustment . . . peak performance always.

The pump is a separate and replaceable unit totally enclosed in a compartment connected to supply tank, never subjected to pressure. If pump leaks—leak is caught in this chamber instead of running on floor.

(above, right) World's greatest fuel unit makes all others obsolete. Cut-off "sharp as lightning . . . positive as Fate."

(right) Picture shows pump removed. Simply slip it on the shaft. Easier than cleaning a strainer. No replacement delay — no transportation charges. Outlasts a dozen others.

FACTS on EXTRA PROFIT with ALDRICH HEAT-PAK products are FREE

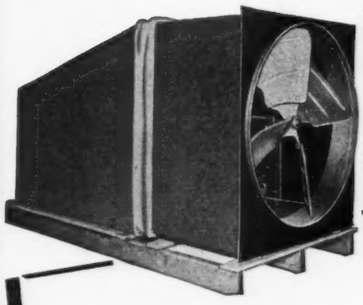
ALDRICH CO.

PEORIA, ILLINOIS

The Only Practical Summer Cooling That 90% of Homeowners and Business Places Can Afford

REX AIRATE

ATTIC VENTILATION



cools an entire house in the hottest weather. Easy to install. Sizes for every type home. Capacities: 4,500 to 15,000 cu. ft. of cooling air per minute.

Here's Your Chance to Make BIG PROFITS This Summer!

COMMERCIAL COOLING

Restaurants, hotels, theaters, and stores of every type all need this type of summer cooling equipment. Plugs into any outlet. Can be moved from place to place.

Stands 42" high; delivers 7,000 cu. ft. of cooling air per minute. Other styles and models.

MAIL THE COUPON

AIR CONTROLS, INC.
Div. of The Cleveland Heater Co.
1933 West 114th, Cleveland, Ohio

NAME .....

ADDRESS .....

CITY .....STATE.....

A. A. 5-38

Mr. Jobber! Mr. Dealer! —In 1938

If You Want to Get the Job— Quote

"HOME COMFORT"

And It's Yours.

- **Absolutely Gas Tite Steel Furnaces**
- **Beautifully Styled Casings**
- **Extra Heavy Boiler Plate Steel Drums**
- **Blower — Either Side or Back**
- **Priced Below the Market**
- **In 1938 It's "HOME COMFORT"**

Don't Just Bid—Get the Job
Get Our Prices and Data

"HOME COMFORT" FURNACE & MFG. CO.
2901-71 Elliott St. St. Louis, Mo.

MULTITHERM
Conditioning Units
Simplified—Compact
—Easily Installed
—Quiet Operation

Can be suspended from ceiling as shown, or floor mounted. Few if any building alterations required in order to install.

Ideal for Stores, Cafes, Theatres, Offices, etc.

Last word in low-cost air conditioning. Easy to sell —and they stay sold because of guaranteed performance. Backed by 25 years' experience. Wide range of combinations—a unit of proper size and capacity for practically any cooling, heating or complete conditioning need. Quiet in operation.

Sizes up to 15,000 CFM. ***Write for Bulletin 107.***

SPECIFY CLARAGE for COMPLETE AIR CONDITIONING · VENTILATION · HEATING · COOLING · MECHANICAL DRAFT · FANS & BLOWERS FOR INDUSTRIAL NEEDS

CLARAGE FAN COMPANY • Kalamazoo, Mich.
SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES

New Literature . . . .

For your convenience in obtaining copies of new Literature, use the coupon on page 94.

202—Asbestos Cement

F. E. Schundler and Company, Incorporated, Joliet, Illinois, is distributing specifications and working details for Schundler mineral roofing slabs. Another small folder is entitled "Just Between You and the Heating Plant."

◆

203—Small A-C Welders

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, announces a publication describing the features, construction and application of the Midget Marvel Flexarc welder. Specifications and operating costs are included together with a list of questions and answers covering the use and operation of this low cost welder.

◆

204—Distinctive Casing Styling

The Lau Blower Co., Dayton, Ohio, offers casing moulding sample with price list and complete data. Lau casing mouldings enable the manufacturer to fabricate casings of distinction in his own plant at a fractional cost of the price of ready-made casings. They offer almost unlimited design possibilities and are manufactured with U-channels to permit quick and easy assembly.

◆

205—Mineral Wool Performance

Johns-Manville Corporation, New York City, is distributing a report of performance of J-M rock wool home insulation as determined by opening the walls of 90 houses insulated with rock wool for from one to ten years, and selected at random in different parts of northern United States. This report is entitled "Evidence That Mineral Wool Is a Permanently Efficient Insulation for Houses." Twenty-nine of these homes were air conditioned.

◆

206—Stamping and Manufacturing Facilities

The Commercial Shearing & Stamping Co., Youngstown, Ohio, is distributing a new tank head and stamping catalog disclosing the company's range of manufacturing facilities and experience in the medium and heavy stamping field. This catalog pictures standard products and illustrates a few special items which the company has made. The company is equipped for many types of heavy plate stamping.

◆

207—Sheet Strip Stock List

Central Steel & Wire Company, 4545 South Western Blvd., Chicago, is distributing Stock List No. 40. The complete stock list describes the sizes, analysis and physical properties of hot rolled, cold finished steel, brass and copper products, aluminum, stainless steel and welding wire in Chicago, Detroit and Dayton warehouses for immediate shipment. Facilities enable the company to slit to width and shear to size.

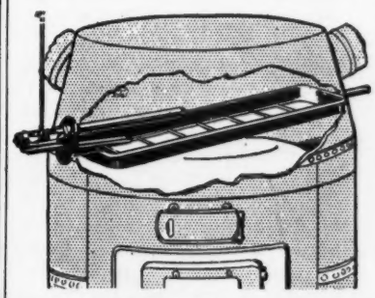
◆

208—Stoker Literature

Conco-Sampsel Stoker Corporation, Mendota, Illinois, is distributing seven new pieces of literature covering Conco 1938 stokers and controls.

An eight-page folder covers the residential type stoker—both hopper and bin feed models; another eight-page folder covers the heavy duty Conco stoker for factories, stores, apartments, clubs, hotels, garages, schools, theatres, public buildings and large residences; a four-page folder tells of "Relief from cold mornings, furnace tending, dirt tracks and unhealthy temperatures;" a two-page folder "While the City Sleeps" mentions the budget plan which permits up to three years to pay; another two-page folder gives cost comparisons with gas, oil and hand firing; a small envelope stuffer "Just Relax" calls attention to the elimination of furnace drudgery; another "The Magic Hand" pictures and describes the control mechanism and the burner.

Ample Capacity for all Warm Air Heating Conditions



. . . but the heat - control principle of THERMO-DRIP Humidifier prevents any excessive moisture.

Standard models for any type or make of warm air furnace. Also models designed especially for plenum chambers—all with STAINLESS STEEL Pans . . . more for your money!

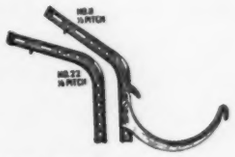
Yes . . . any installation of a THERMO-DRIP Humidifier gives the homeowner air moistening capacity to spare. But that doesn't mean oversaturated indoor atmospheres. The water valve opens and closes as bonnet temperature rises or drops. You'll sell more humidifiers when you present THERMO-DRIP's powerful selling features. Try it!

AUTOMATIC HUMIDIFIER CO.
18th and Main Streets CEDAR FALLS, IOWA

-BB-
THE ONLY COMPLETE QUALITY LINE

No. 30 SHANK
The shank with twelve distinct adjustments. The shank that is designed to *Lick That Tough Job!*

Nos. 11 and 22 Shanks made especially for side rafter attachment, this combination will take care of any pitch. Equipped with the



NEW STARTING TEAT
which is a small wedge shaped prong, that, when tapped lightly will hold the shank securely in place—leaving both hands free for the use of nail and hammer.

We manufacture our complete line of hooks and hangers in black and tinned steel, as well as copper and Tuf-Bronze—A story in itself.

Write for Complete Descriptive Literature

BERGER BROS. COMPANY
229-237 Arch St. PHILADELPHIA, PA.
BRANCH 16th and Grove Sts. JERSEY CITY, N. J.

For REGULATORS and CONTROLS
BEAD CHAIN*
This smooth running, non-kinkable chain of swiveled metal beads improves both the appearance and operation of ventilator, sky-light, heat control and other regulators. From your jobber, in standard sizes, metals and finishes. Can we help you solve a problem?
COUPLINGS
Cord Connectors and Pendants for many uses, in standard sizes and finishes.
THE BEAD CHAIN MANUFACTURING CO.
TRADE MARK REG. U.S. PAT. OFF.
BRIDGEPORT, CONN.

PREMIER FURNACE CLEANERS
COMPLETELY EQUIPPED

HALF HORSE POWER MODELS
60.00 and 64.50
ONE HORSE POWER MODELS
84.50 and 89.50

Premier Furnace Cleaners are powerful and light weight, yet sturdily built to stand years of rugged service. Weighing less than 50 pounds, they are one-man cleaners and have been the furnace man's favorite for years. Premier Cleaners are ideal for upstairs use and may be used independently from the container for suction and blowing use in cleaning air ducts, registers, grills, radiators and air conditioning equipment.

Motor specifications for these powerful cleaners are:
½ H.P. maximum vacuum 31 inches in water.
1 H.P. maximum vacuum 46 inches in water.

Business-Getting, Return Post Cards are Available for Dealers at Low Cost

Buy It From Your Local Jobber or Write the Manufacturer

Furnace Cleaning Instruction Booklet Free with Each Cleaner

ELECTRIC VACUUM CLEANER CO., INC.
1734 Ivanhoe Road • Cleveland, Ohio

DUCTATHERM

A NEW MERCOID CONTROL

DESIGNED FOR REGULATING TEMPERATURES OF AIR CONDITIONING DUCTS

This instrument is compact in size, neat in appearance, easy to adjust and reliable in performance. It is equipped with a dust-proof, trouble-free Mercoid magnetic mercury contact switch. ¶ You will find the Ductatherm ideal for duct temperature regulation. ¶ Mercoid engineers are at your service in helping you solve your control problems. ¶ Write for details.

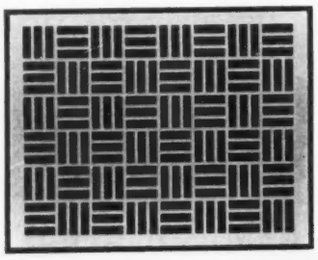
THE MERCOID CORPORATION, 4201 Belmont Ave., Chicago

PERFORATED METALS

Architectural Grilles

Grilles of distinction for fine buildings in a wide variety of designs, including standard and many original patterns. Write for information!

Our product includes perforated metal for all industrial and ornamental uses in all kinds of metal.



The Harrington & King PERFORATING CO.

5649 Fillmore St., Chicago, Ill. New York Office, 114 Liberty St.

New Literature . . . .

For your convenience in obtaining copies of new Literature, use the coupon on page 94.

209—Ludlite—Stainless Steel for Everyman

Ludlum Steel Co., Watervliet, N. Y., is distributing a reprint entitled "Stainless Steel for Everyman," by T. W. Lippert, Metallurgical Editor, The Iron Age, and illustrated by photos by Robert Yarnall Richie. This is a complete story of Ludlite and its many uses.

210—Hydroxalation Type Burner

Par Appliances, Inc., (affiliated with the LaCrosse Tractor Co.) LaCrosse, Wisconsin, is distributing literature illustrating and describing the Par automatic oil burner for warm air furnaces and air conditioning systems. The Par oil burner is of the hydroxalation type. The Burnett-Par winter air conditioning system, equipped with the Par automatic oil burner, provides automatic heat, filtered air circulation and humidification.

211—Superfex Dealer Helps

Perfection Stove Company, Incorporated, Cleveland, Ohio, is distributing three new pieces of literature—Constant Air Conditioning with Superfex oil-burning heating plants; proposal to install Superfex Oil-Burning warm air conditioner with copy of the general specifications and the agreement and terms of payment; and a folder entitled "Buy 24-hour air conditioning . . . not just 8."

212—A. C. Grilles of Distinction

Hart & Cooley Manufacturing Co., Holland, Michigan, is distributing a new consumer brochure entitled "Air Conditioning Grilles of Distinction," prepared to aid air conditioning contractors in their sales to consumers. The illustrations show the installed appearance of the various H & C grille designs.

213—6 Minutes with 6 Metals

The International Nickel Company, Inc., 67 Wall Street, New York City, is distributing a 16-page booklet (4x9 in.) entitled "6 Minutes with 6 Metals," covering the characteristics and uses of the special alloys such as Inconel, "K", "S", and "R" Monel, as well as the more generally known Monel and nickel.

214—Register Book No. 38

The Auer Register Company, 3608 Payne Avenue, Cleveland, has just issued its new Auer Register Book No. 38, illustrating and listing registers, intakes and grilles for gravity heating and air conditioning systems. This catalog shows many recently added models to the Auer line.

215—Steel Buyers' Guide

Joseph T. Ryerson & Son, Inc., 16th & Rockwell Sts., Chicago, is distributing Steel Buyers' Guide—a handy pocket-size book which gives complete listings and descriptions of the range of Certified Steels and allied products carried in stock. Included are handy reference tables, weight charts, standard specification listings, etc.

216—Controlled Winter Comfort

The Waterman-Waterbury Company, Minneapolis, Minnesota, is distributing "Controlled Winter Comfort for the Home," a 24-page booklet illustrating and describing Waterbury winter air conditioning to fit requirements.

217—A-C Fittings Catalog

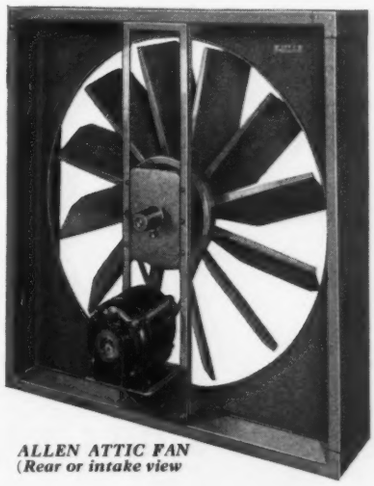
United States Register Company, Battle Creek, Michigan, is distributing a new No. 27 A-C air conditioning fitting catalog with latest correct list prices, as well as illustrations and descriptions of pre-fabricated ducts and fittings for the latest types of modern air-conditioning and forced air installations. These fittings are manufactured and shipped from four points—Battle Creek, Michigan; Minneapolis, Minnesota; Kansas City, Missouri; and Albany, N. Y.

REACH THE "MODEST HOME"
WITH THIS
NEW *Dailaire* UNIT

Are you able to reach the "modest home" with your present air-conditioning line? This new Dailaire winter air-conditioner is designed to meet the needs and the pocketbook of every small home owner. Complete with gas or oil burner, top blowers, filters, and humidifier, and the proven efficiency of Dailaire units. It costs less than an oil burner did five years ago. Why not meet the "modest home" demand with this new model? We will be glad to send full information today.

DAIL STEEL PRODUCTS COMPANY
1050 Main St. **LANSING, MICH.**

SELL THIS LOW-PRICED HOME "COOLER"



ALLEN ATTIC FAN
(Rear or intake view

Low priced to buy—low cost to use. Allen Attic Fan sells to every home owner who wants house cooled inexpensively. A few cents a night buys comfort. Great for building your summer volume. Push it NOW—make the most of the summer season. Full details—specifications—installation diagrams supplied. Silent operation. High quality, made by the makers of Allen Turbine Ventilators.

Write or wire us.

THE ALLEN CORPORATION
9752 ERWIN AVENUE, DETROIT, MICH.

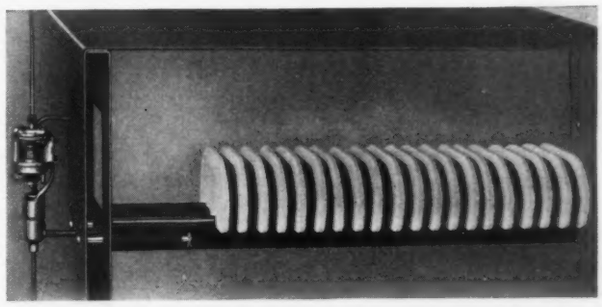
MAKE BIGGER PROFITS
WITH A
KOR-NER-LOK
FORMING MACHINE

ON THE JOB

YOU can turn out corner or Pittsburg locks at the rate of 30 feet a minute — for rectangular pipes and fittings and similar work—for heating, ventilating and air conditioning . . . Take a Binkley Kor-Ner-Lok Machine right to the job . . . Do the work more neatly, quickly and at less cost —greater profit. Investigate the profit possibilities of a Kor-Ner-Lok today — before competition gets the jump on you.

WRITE FOR BULLETIN A-2

BINKLEY MANUFACTURING CO.
WARRENTON, MO.



AUTOMATIC **JUNE**
HYDRO-METRIC HUMIDIFYING **SYSTEMS**

Equip your air conditioner or warm air furnace with Automatic June and you are assured it meets every humidifying condition accurately and reliably. It is a complete humidifying system, easy to install, simple, trouble-proof. "No more weeping windows" makes a big talking point for your dealers. Send for literature and prices.

MONMOUTH PRODUCTS CO.
1933 E. 61st St., Cleveland, Ohio

No Bearing Worries with RANDALL PILLOW BLOCKS

Randall Standard Pillow Block (single reservoir) with large special oil cup.

Many manufacturers of air conditioning equipment have learned that the installation of Randall Pillow Blocks has ended their bearing worries. For Randall Pillow Blocks are exceedingly efficient in operation. They give extra years of service with a minimum of attention and are unusually quiet. For these reasons leading manufacturers of air conditioning units have standardized on Randall Pillow Blocks. They are made in a variety of types and in every needed size. Write for catalog and price list without obligation.

Randall GRAPHITE PRODUCTS CORP.
Dept. 511 609 W. Lake St., Chicago, Ill.

SELL Pacific

AND PACIFIC QUALITY WILL KEEP YOUR CUSTOMERS SOLD

Write for details of the liberal Pacific Dealer Plan and illustrated descriptive literature showing the complete line of up-to-the-minute Pacific Gas Heating Appliances.

Pacific GAS RADIATOR CO.
1740 W. Washington Blvd., Los Angeles, Calif.
Manufacturers of the Most Complete Line of Gas Heating Appliances in the West

New Literature . . . .

For your convenience in obtaining copies of new literature, use the coupon on this page.

218—Cabinet Units

Furblo Company, Hermansville, Michigan, is distributing an 8-page folder illustrating and describing their Furblo cabinet units, Fairweather Units, and blowers for air conditioning.

◆

219—Ath-A-Nor Furnaces

The May-Fiebeger Company, Newark, Ohio, is distributing two 4-page folders—one covering the Deluxe Ath-A-Nor and the other the original smokeless furnace. Specifications and ratings are listed on the back of each folder.

◆

220—Arc Welding Handbook

Complete data on procedure, speeds and costs, as well as drawings and photos of arc welding of sheet metal, all types of joints in various positions, is contained in the new "Procedure Handbook of Arc Welding Design and Practice," just published by The Lincoln Electric Co., Cleveland, Ohio.

Latest sheet metal arc welding data includes instruction for making butt, fillet, lap, corner and edge welds in flat, vertical and overhead positions. Data contained in 15 tables gives number of beads, size electrode, current amperes, minimum arc volts, welding speed in feet per hour and pounds of electrode per foot of weld in thicknesses 8 gage to and including 22 gage. The fit up of the work for the various welds is illustrated by line drawings. Methods of estimating welding costs are explained. Typical examples of sheet metal arc welded into various products, fittings, duct work, etc., are shown by photos.

The Handbook contains over 1000 pages and more than 1200 illustrations. The eight sections, in which the book is divided, cover the following subjects: Part I—Welding Methods and Equipment; Part II—Technique of Welding; Part III—Procedures, Speeds and Costs for Welding Mild Steel; Part IV—Structure and Properties of Weld Metal; Part V—Weldability of Metals; Part VI—Designing for Arc Welded Steel Construction of Machinery; Part VII—Designing for Arc Welded Structures; and Part VIII—Typical Applications of Arc Welding in Manufacturing, Construction and Maintenance.

The Procedure Handbook is 5¾ x 9 inches in size. The binding is brown semiflexible simulated leather, gold embossed. Copies will be mailed, post paid, to any address at small cost.

FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave., Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Circle numbers in which you are interested):

70	71	72	73	74	75	76
77	78	79	80	81	82	83
84	85	86	87	88	89	90
91	92	93	94			
194	195	196	197	198	199	200
201	202	203	204	205	206	207
208	209	210	211	212	213	214
215	216	217	218	219	220	

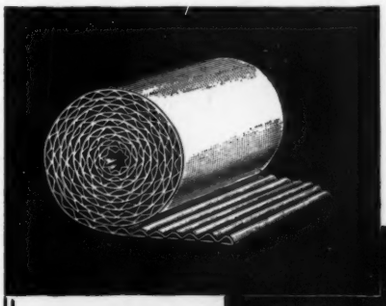
Name..... Title.....

Company ....

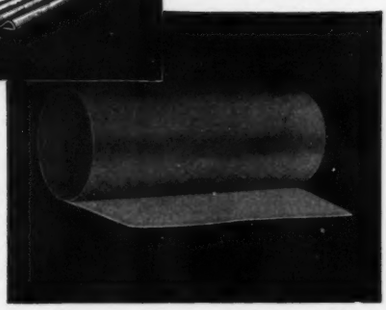
Address .....

Are you Manufacturer——Jobber——Dealer——

SAL-MO Asbestos Insulation Curbs HEAT LOSS in Warm Air Furnace Installations . . . Assures More Efficient Operation.



(Left) SAL-MO Asbestos Aircell Paper



SAL-MO Asbestos Paper and Rollboard

BE sure that your Warm Air Furnace installations do not have that 30% heat loss that is usual with uninsulated pipes. When you use SAL-MO Asbestos Papers and Millboards you are sure of a perfect job and perfect insulation. SAL-MO Asbestos Products are of uniform high quality, manufactured from the best grade of Canadian asbestos fibre.

Other SAL-MO Products include Pipe Joint Tape, Furnace Cement, Fireboard and coverings for all types of High and Low Pressure Pipe Lines.

SALL MOUNTAIN COMPANY
176 West Adams St. CHICAGO, ILL.

WHITNEY LEVER PUNCHES

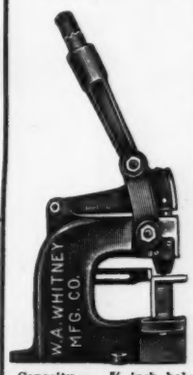
No. 4B PUNCH

Length—8½ inches. Capacity ¼-inch through 16 gauge. Deep Throat—2 inches. Weight—3 pounds. Punches and Dies—⅛" to ⅜" by 64ths.

No. 6 PUNCH

Length—26½ inches. Capacity — ¼-inch hole through ⅜-inch iron; especially adapted for button punching or templet work. Punches and dies 1/16" to ⅜" by 32nds.

No. 91 PUNCH



Capacity — ⅝-inch hole through ¼-inch, 1-inch hole through ⅜-inch and 2-inch hole through ⅛-inch iron. Depth throat 5 inches. Weight—82 lbs.

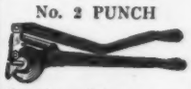
We have tools for every purpose needed by Sheet Metal Contractors.

Ask your Jobber

No. 1 PUNCH

Length — 34 inches. Capacity — ⅝-inch hole through ¼-inch iron. Punches and dies in sizes from ⅛ to ⅜ by 64ths.

No. 2 PUNCH



Length — 23 inches. Capacity — ⅜-inch hole through ¼-inch iron. Punches and dies in sizes ⅜-inch to ½-inch by 64ths.

CHANNEL IRON PUNCH

Companion to No. 2 Punch. Every part of the two Punches Interchangeable, including punches and dies. Capacity—¼-inch hole through ¼-inch iron.

W. A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

JUST OFF THE PRESS

HAVE YOU RECEIVED YOUR COPY?

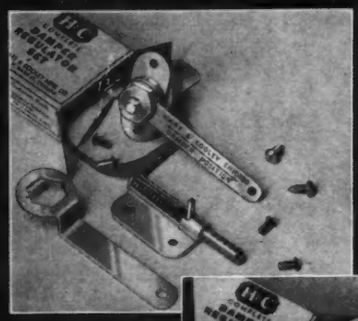
WRITE

The New Rock Island Register Catalogue Shows Complete Line of "No-Streak" Registers for Gravity and Forced Air Installations.

Also many helpful Charts, Tables, Estimating Data—Prices. A catalogue every Dealer should have. Send for your copy today.

ROCK ISLAND REGISTER CO.
ROCK ISLAND ILLINOIS

H&C DAMPER REGULATOR SETS



BRACKET TYPE

With ¼" Bearings as shown No. 50¼. ⅜" size No. 50⅜.

DISK TYPE

With ¼" Bearings as shown No. 80¼. ⅜" size No. 80⅜.

¼" sets have snap end bearings for easy installation of small dampers. All sets may be used with either splitter or regular dampers. All parts have rust-proof finish. Insure satisfactory installations by using H & C Damper Regulator Sets, All leading jobbers carry them.

HART & COOLEY MFG. CO., 61 W. KINZIE ST., CHICAGO, ILL.

G&O RADIATION
FINNED COILS
G&O FINNED RADIATION COILS for all industrial applications are available in a wide range of sizes, for high and low pressure operation.
SEND FOR CATALOG

THE G&O MANUFACTURING COMPANY
New Haven, Connecticut
Pioneer Manufacturers of Square Finned Tubing in the United States

Sectional Construction
Is Just One New Feature of
The New Series 300
Furblo CABINET UNITS
MAKES INSTALLATION EASIER! ACCESS DOORS CAN BE PLACED ON ANY SIDE DESIRED!
Ask Your Jobber to Show You The New Furblo

FURBLO CO., Hermansville, Mich.

California Office Building

(*Continued from page 64*)

Of course, the above percentages for the monthly heat usage do not check with the actual Weather Bureau figures, but they are close and the assumption of two months at 20% and four months at 11% with 2 months at 5% and two months at 3% makes the figuring much easier.

It is quite interesting to see how the actual gas consumption checks with the estimate and the following table gives the figures:

Month	Actual Per Cent	Furnace	Water Heating Small Appliances	Total	Cost
January, 1937	23.0	29,900	3,700	33,600	24.91
February	21.3	27,700	3,700	31,400	23.81
March	12	15,700	3,700	19,400	17.64
April	16	20,900	3,700	24,600	20.41
May	4.25	5,500	3,700	9,200	9.58
June	.54	700	3,700	4,400	5.79
July	....	.....	3,600	3,600	5.01
August	....	.....	3,000	3,000	4.32
September	.13	100	3,700	3,800	5.42
October, 1936	.23	300	3,700	4,000	5.47
November, 1936 ...	9.0	11,700	3,700	15,400	14.48
December, 1936 ...	13.4	17,500	3,700	21,200	18.71
	99.85	130,000	43,700	173,000	155.55

The actual usage is so close to the prediction for the year that it looks as though the figures had been "doctored," but we are showing the data just as it comes from the records. It must be admitted that luck was on our side in order to come out this closely.

The monthly percentages seem to indicate that last fall and winter the season was shoved ahead one month for it is evident that January and February were the two heavy months instead of December and January. Also, April was much heavier in usage than would be anticipated.

We arrived at the figure of 3,700 cu. ft. per month for the water heater by taking the average for the five summer months.

Any analysis of consumption on the basis of degree days will be of little value for the reason that we have no accurate data on the figure for degree days and the building is not heated at night.

The figure of 1500 full load hours of burner operation must have been correct, as the actual consumption checks with the estimate.

An inspection of this building and the heating system was made on this date, (October 15, 1937). The system had been in operation one full winter and the better part of two summers, used for ventilation and cooling.

Some lime had deposited in the humidity pan, but water was being supplied and evaporated. The filters were badly clogged up. So much so that the flow of air was materially slowed down. The area of the filters was about 1500 sq. in. A series of readings with a velometer was taken giving an average velocity through the filters of 122 F.P.M. The air flow was therefore about 1270 C.F.M. The

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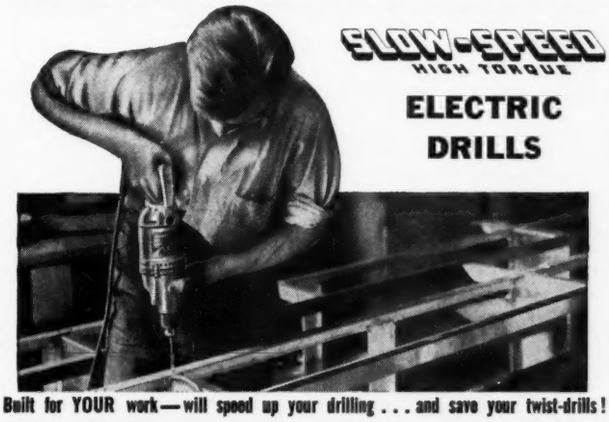

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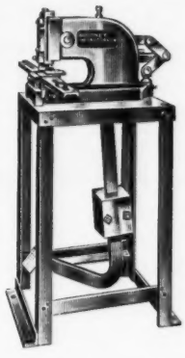

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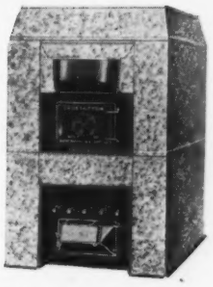

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design for the air handled by the fan was 1570 C.F.M. With these dirty filters in place, the high limit control which was set to cut off the gas at 300 degrees was just on the verge of tilting over to shut off the gas, so the bonnet temperature was somewhere around 275-290, if this instrument was accurate.

We removed the filters. The bonnet temperature dropped almost at once and the dial on the high limit control showed a temperature of about 190°. A new series of velocity readings gave an average velocity of 148 F.P.M. and the air flow with the filters out was 1540 C.F.M.

Evidently the flow with clean filters would be something less than this value, so that our design C.F.M. of 1570 was a bit too high.

The temperature of the air supply flowing during this test was 69 degrees and we took the temperature of the air from a register at the end of the building. This showed as 150°, the bonnet being around 190°. We had a drop in the duct of 40° for about a 40 ft. run from bonnet to register.

We regret that we have no data on the relative humidity in the rooms at this time.

◆

Voorhees Precalculated Engineering

(*Continued from page* 57)

$$(66 \times 2.5 \times 5) + (141 \times 2.5) + (94 \times 5) = 1600 \text{ (approx.)}$$

The number of standard windows which will produce the same heat loss as one window of any other size, is the Table 9 factor and is represented by the equation:

$$\text{Table 9 factor} = \frac{(66 \times w \times h) + (141 \times w) + (94 \times h)}{1600}$$

For any window dimensions not given in Table 9, the factor may be calculated by substituting the width (w) and height (h) in this formula and solving.

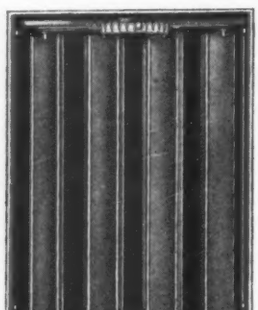
◆

Oil Burner Association

C. H. Chalmers of the Chalmers Oil Burner Company, 1234 Central Avenue, Minneapolis, Minnesota, reports that the Twin City Oil Burner Association, Inc., met recently at dinner—296 at dinner with 15 or 20 arriving in time for the program—with music and speeches having to do with the welfare of the oil heating industry.

Mr. Marshall, sales manager for Williams Oil-O-Matic, gave the principal address of the meeting.

This association has been organized to promote the use of safe, efficient, comfortable, automatic heat for the home owner, to disseminate authentic educational information to the public regarding the efficiency of automatic heating with oil. Its members pledge themselves to use quality materials, to make neat installations; to take care of service will all reasonable speed; and generally to conduct their business according to the highest business standards.



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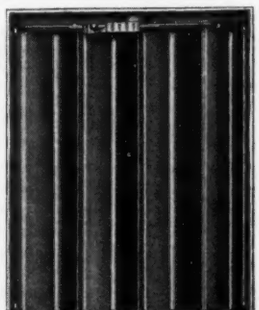

Air-Con fully open deflects air to left

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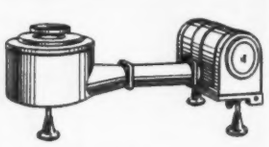

The Par oil burner is the acme of performance, efficiency and simplicity. Only one moving part, a 1/100 h. p. motor and fan. Initial cost is low, requires no firebrick or precast combustion chamber. Has no nozzles to clog or leak . . . fully enclosed to prevent damage and tampering. In addition, the Par oil burner is covered by a quarantee and a five year Restoration Bond which fully protects the dealer. You can save and make considerably more money by handling the Par oil burner. Write today for further information.

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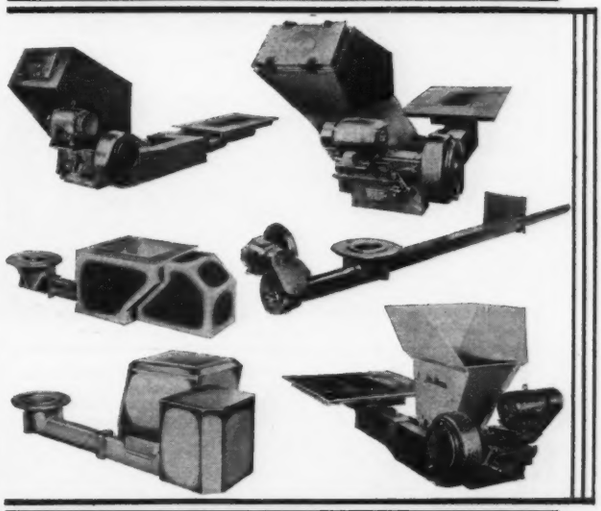

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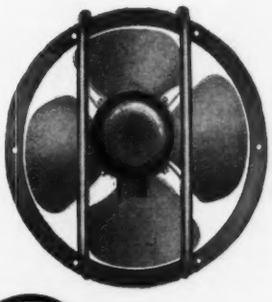

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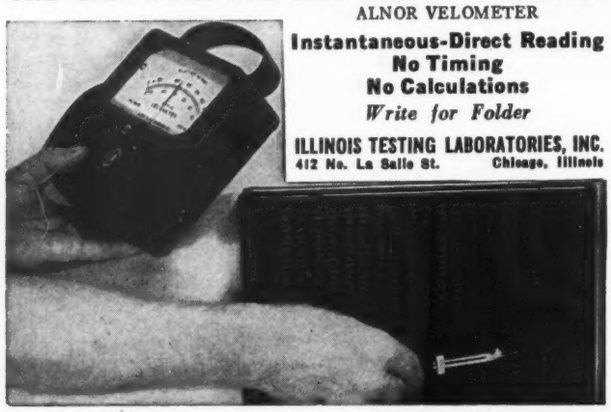

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Neubecker's Pattern

(*Continued from page* 60)

for the cheek. From points *7* to *9* in the side elevation draw dotted lines to *3*. These lines then represent the bases of triangles which will be constructed in diagram *X* (at the left) whose altitudes will be equal to the differences shown in the plan between point *3'* and points *7'-8'-9'* and *1o'* measured from the line *5'-D*.

The true lengths are found as follows: Take the distances in side elevation from *3* to points *7-8-9* and *1o* and set them off on the vertical line 3^x-$1o^x$ in diagram *X* as shown from 3^x to 7^x to 8^x to 9^x to $1o^x$. From these points 7^x to $1o^x$ draw lines at right angles to 3^x-$1o^x$ indefinitely and make the distances $1o^x$-$1o^t$, 9^x-9^t, 8^x-8^t and 7^x-7^t equal respectively to the distances measured from the line *6'-D* in plan to points *7'-8'-9'* and *1o'*.

Draw lines in diagram *X* from 3^x to 7^t-8^t-9^t and $1o^t$ the desired true lengths. The pattern for the cheek is now in order. Take a tracing of the collar 1-*2*-1*o*-11 in side elevation and set it off as shown by 1-*2*-1*o*-11 in the center cheek pattern which has been placed in a vertical position (for want of space) and has been designated *R*. Now with $1o^t$-3^x in the true lengths *X* as radius and *1o* in *R* as center, describe a short arc near *3* and intersect it by an arc struck from *2* as a center with radius equal to 2^v-3^v in the upper throat pattern *P*. Now with radii equal 3^x-9^t, 3^x-8^t, and 7^t in the true lengths and using *3* in the cheek pattern *R* as a center, draw short arcs near *9-8* and *7* respectively.

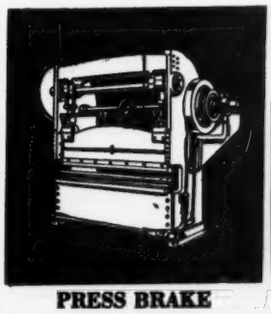
Now set the dividers equal to the division on the *slant line* in the heel pattern *T*, between the points $1o^v$ and 7^v and starting from *1o* in the cheek pattern *R* step to arc *9*, then to *8* and *7*. Take the true length of the line *3-6* in side elevation and with *3* in the cheek pattern *R* as center, describe the arc *6*. Set the dividers from 7^v to 6^v in heel pattern *T* and set it off from *7* to *6* in cheek pattern *R*. Draw the bending line *3* to *6*.

Now take a tracing of *3-4-5-6* in the side elevation and reproduce it in cheek pattern *R* as shown by *3-4-5-6*, being careful to have *3-6* come directly over the line previously drawn from *3* to *6* in cheek pattern *R*. Draw the bending line from *1o* to *3* and the curved outline through points from *6* to *1o*. Then will 1-*4*-5-11 in *R* be the net cheek pattern for the reverse center elbow.

The short approximate rule for laying out the cheek pattern just described is as follows:

Using the method which follows, no triangulation is necessary for the lines *3-7*, *8* and *9* in the side elevation, only two lines will be triangulated, that from *3* to *1o* and the dotted line shown from *1o* to *6*. Take this distance *6* to *1o* and set it off in diagram *Y* of the true lengths, as shown from $1o°$ to $6°$. From $1o°$ draw the right angle $1o°$-$1o^a$ equal to $1o^x$-$1o^t$ in diagram *X* and draw the true length from $1o^a$ to $6°$ in diagram *Y*, the desired true length of *1o-6* in side elevation. With radius equal to $1o^a$-$6°$ in diagram *Y* and using *1o* in

(*Continued on page* 102)



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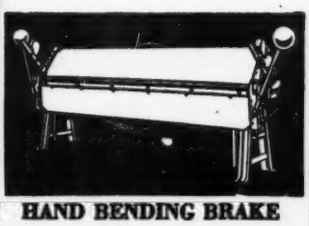

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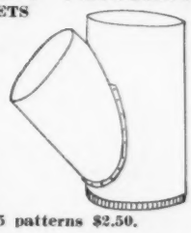

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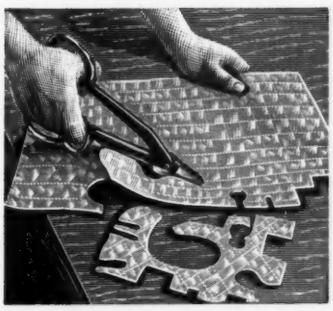

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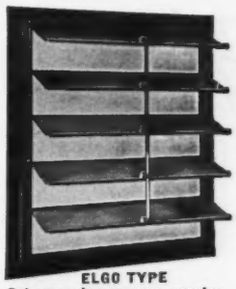

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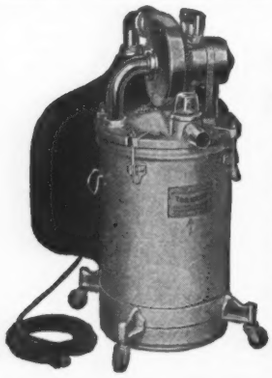

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"Genuinely Friendly"

Toledo Ordinance

(*Continued from page* 67)

make, or cause to be made an inspection of such work. Upon finding that the work complies in all respects with the terms of this code, there shall be affixed by said inspector or his representatives to each stack or register head a certificate stating that the work and materials comply with the ordinance relating thereto.

Final inspection of plant shall be made after the whole is connected up and ready to operate, but before any fire has been started.

It shall be unlawful for any person to lath over, plaster or cover up any warm air heating work before such work has been inspected and certificate above referred to has been attached.

The division of building regulations shall have the right and authority to remove or order removed all such lath, plaster, or other covering which may have been placed over such work before same has been inspected.

The person, firm or corporation ordering or causing such work to be covered up as herein set forth, shall be subject to the penalties set forth by the terms of this ordinance.

To qualify as an inspector the applicant must pass the same examination as required of a heating contractor.

Section 16. Sections or Parts Held Invalid Shall Not Affect Others

Sections of this ordinance or parts thereof, are hereby declared to be independent sections and parts, and the finding or holding of any section or part thereof to be unconstitutional, void or ineffective for any cause shall not affect any other section, sections, or parts thereof. The provisions of this ordinance shall not apply to public institutions, commercial or industrial plants, which maintain a department for the maintenance, repair or alteration of Warm Air Heating apparatus in or about the premises used for the conduct of their business.

Section 17.

Sections 358 to 364 both inclusive of the Code of the City of Toledo of 1919 and Section No. 9 of Ordinance No. 2889 of 1923 shall be, and the same are hereby repealed.

Section 18.

This ordinance shall be in force from the earliest period allowed by law.

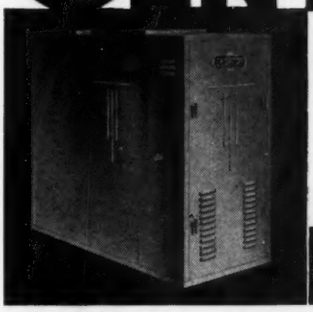
◆

Newbecker's Pattern

(*Continued from page* 100)

cheek pattern *R* as center, describe the short arc near *6* and intersect it by an arc struck with *3* as a center and *3-6* in the side elevation as radius. Now using *b-1o* in the side elevation as a radius, with 1*o* and *6* in the cheek pattern *R* as centers intersect arcs at *b'*. Using the same radius with *b'* as center, draw the arc shown dotted from 1*o* to *6*. Note the change in the curves of the pattern shapes. The solid curved line is geometrically accurate, the dotted curved line an approximate, but close enough for practical work. Whether the cheek pattern *R* is developed by the geometrical or approximate rule, the bending lines *must always* be made along the lines *2-1o*, 1*o-3* and *3-6* in the cheek pattern *R*.

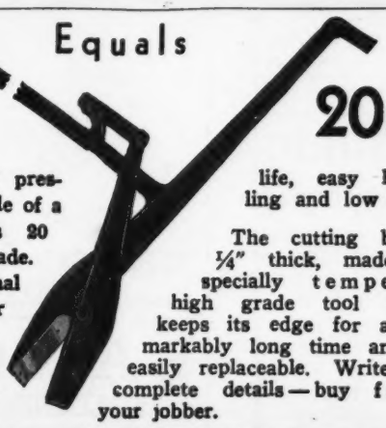
CENTURY
ZEPH-O-LATOR
85%
OVERALL EFFICIENCY



CENTURY ENGINEERING CORP.
CEDAR RAPIDS IOWA

Equals

1 lb. **20 lbs.**



Every pound of pressure on the handle of a Viking produces 20 pounds at the blade. Viking's original compound lever arrangement does it. Choose a Viking for its strength, long life, easy handling and low cost.

The cutting blade, ¼" thick, made of specially tempered high grade tool steel, keeps its edge for a remarkably long time and is easily replaceable. Write for complete details — buy from your jobber.

VIKING SHEAR CO. ERIE, PA.

In Buffalo, It's
HOTEL LENOX

New rooms and baths, new decorations and furnishings. Everything for your comfort. A new Bar, too, where you can relax amid pleasant surroundings and good company.

RATES
Single $2.50 to $3.50.
Double $3.50 to $6.00
Family Suites $7.00 up.
Special for 2 Rooms and bath: 3 persons $6.00; 4 persons $7.00.

Write for free AAA road map and booklet containing handy map of downtown Buffalo.

CLARENCE A. MINER, President
HOTEL LENOX, North Street nr. Delaware Ave., Buffalo, N. Y.

Air Conditioning

—What happens between two rooms, one having a six minute air change, and the adjoining room a twelve minute air change?
—Can you install a thermostat control system properly?

The answers to these and hundreds of other mechanical questions about air conditioning are appearing in the monthly *Air Conditioning Section* of AMERICAN ARTISAN.

If you do not now get the ARTISAN, send us $2 and we will enter your subscription for a full year—12 consecutive issues. Your subscription will yield a rich harvest of money making ideas and solutions to many mechanical problems connected with warm air heating and sheet metal contracting.

AMERICAN ARTISAN
6 North Michigan Ave. Chicago, Ill.

FIRES GO OUT IN MAY!

ARE YOU READY FOR THE BIG RUSH OF SPRING FURNACE CLEANING BUSINESS? Your customers are looking for ways to save, this year. And you're looking for ways to save money from your earnings at this work. A RUGGED MACHINE WHICH WORKS FAST IS YOUR ANSWER. THAT'S THE KENT DOUBLE SUCTION CLEANER.
Write us today for full particulars.

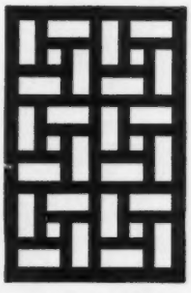
THE KENT COMPANY, Inc.
167 Canal St. Rome, N. Y.

THE JOHNSON NO. 101 BENCH FURNACE IS POWERFUL AND ECONOMICAL

You get intense, uniform heat without blower or forced air blast with this efficient Bench Furnace. Designed for heating soldering coppers up to twelve pounds per pair, and heat-treating, tempering, annealing, and case-hardening carbon steel tools or small metal parts. Equipped with two powerful Johnson Bunsen Burners, each with shut-off valve and pilot-light. A special shelf guards your soldering copper points. Write today for free catalog.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

A NEW "DIAMOND" DECORATIVE CANE



Tile Cane Design R-17 With 52 Per Cent Open Area

For
RADIATOR COVERS • CABINET SINKS • TOYS • FURNITURE • TRAYS • BINETS • LOCKERS • AIR-CONDITIONING UNITS.

•

Furnished in No. 20, No. 22 U. S. S. Ga. in Standard Size Sheets from Stock.

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Write for Sample.

DIAMOND MANUFACTURING CO.
WYOMING, PA.
OFFICES IN PRINCIPAL CITIES

FURNACE • STOVE and BOILER REPAIR PARTS

Over 15,000 Patterns

We Sell Jobbers and Distributors Only

HOMER FURNACE & FOUNDRY CORP.
COLDWATER - - MICHIGAN, U. S. A.

AMERICAN ARTISAN Service Section

FOR SALE

Furnace manufacturer wishes to dispose of steel furnace line, consisting of oil, coal and gas air conditioning furnaces, with many special features. Established 18 years. Over 5000 successful installations. Will listen to any reasonable offer. Address Key No. 433, American Artisan, 6 No. Michigan Ave., Chicago.

BEVERLY THROATLESS SHEARS are indispensable to the modern, up to date sheet metal shop. Light, portable, yet extremely strong, they will make your shearing operations much faster, neater and more economical thru time saved on the job. They are made in two sizes to handle up to 14 or 10 gauge metal and are very reasonably priced.

Write today for literature and prices.

BEVERLY THROATLESS SHEAR CO.
3009 W. 110TH PLACE, DEPT. 3, CHICAGO

SALES BOOK BARGAINS

250 Books	$ 9.50	1000 Books	$23.50
500 Books	13.50	2000 Books	44.00

Printed to your copy with cut. Carbonized. Duplicated.

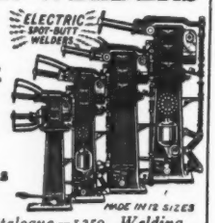
Sample free.

David Nichols Co.
Box 84, Rockmart, Georgia

Weld With EISLER WELDERS

SPOT WELDERS
BUTT ● WIRE SEAM
A. C. ARC WELDERS

Welders as low as $25.00



Ask for 38-W Catalogue—1250 Welding Illustrations.

Submit Samples for Test. No Obligation

EISLER ENGINEERING CO., Inc.
761 S. 13th St. NEWARK, N. J.

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The New, Enlarged 2nd Edition of Platte Overton's

"Forced Air Heating"

215 pages—Cloth Bound—$2.00

This new edition provides all the information needed by the contractor to enable him to design and install any forced air heating system correctly. It includes a brand new data sheet and shows how to fill it in. It outlines step by step a design procedure which may be applied to any job, and contains all the charts, tables, diagrams and formulas necessary. Send $2 for your copy today.

KEENEY PUBLISHING CO.
6 N. Michigan Ave., Chicago, Ill.

YOU

Can double the usual savings

WE

would be pleased to mail you our latest stock list covering everything in metal working machinery—listing many real bargains in our huge stock of more than 2000 machines of all makes, models, types and sizes.

INTERSTATE MACHINERY CO., INC.
107 S. Clinton St., Chicago
(Free Parking)

LANCOL
SOLDERING FLUX

1. Lancol gives off no injurious fumes.
2. Lancol is odorless and causes no discomfort when used.
3. Lancol does not have the strong corrosive action of most fluxes.
4. Lancol is efficient—it causes solder to flow easily with no rolling up, and provides even coverage.
5. Lancol is efficient—it forms a perfect bond.
6. Lancol is more economical — it costs less.

Lancol is ideal as a stainless steel soldering flux—saves time, money and material. One test will convince you that you can't afford to be without a supply in your shop. Write us now for a free trial sample.

F. H. LANGSENKAMP COMPANY
Indianapolis, Indiana
Send for Trial Sample . . . Today!

RIBBED WIRE GLASS - 13c per SQ. FT.

STOCK SHEETS, CASE LOTS, PLUS BOXING F. O. B. BUFFALO, N. Y. SHIPMENT TO ANY PART OF THE UNITED STATES
QUOTATIONS ON ALL KINDS OF GLASS ON REQUEST
Write for Samples
T. J. ATCHESON GLASS CO.
958 Main St., Dept. A, Buffalo, N. Y.

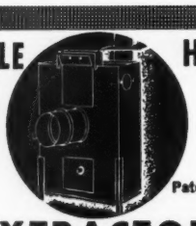
PLANS and LAYOUTS for AIR CONDITIONING

48 HOUR SERVICE

Registered Engineers in Charge

CENTRAL BUREAU for HEATING and AIR CONDITIONING
3030 Euclid Ave. Cleveland, O.

HOWLE HEAT EXTRACTOR



The Howle Heat Extractor is an inexpensive unit installed between the furnace and the stack to prevent the escape of moisture-laden corrosive gases and to redirect and radiate into the basement the heat which would pass up the stack as waste. This "reclaimed" heat will make any heating plant more efficient. Ask Condensation Engineers for full details.

CONDENSATION ENGINEERING CORPORATION
335 S. Western Ave., Chicago, Illinois

G. A. VOORHEES
CONSULTING ENGINEER

FORCED AIR HEATING AND WINTER AIR CONDITIONING

633 S. Delaware St. Indianapolis

AUTOMATIC CONTROL
Repair Service

Thermostats, Relays, Starters and other automatic devices. All makes. Any type.

HALECTRIC LABORATORY
1793 Lakeview Road Cleveland, Ohio

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Classified

SITUATIONS OPEN

WANTED experienced Blower sales engineers to sell simplified, ultra-modern industrial vacuum cleaning systems (permanent installations) to industrial plants. Exclusive territory, straight commission, opportunity to make $10,000 or more a year. Good man or firm wanted in all principal cities especially New York City, Boston, Cleveland, Indianapolis, Detroit, etc. Address: Connecticut Blower Company, 183 Ann Street, Hartford, Conn.

MANUFACTURER'S AGENT WANTED to sell a high-grade line of air conditioning registers to dealers and jobbers. The best in the field at competitive prices. Address: CHARGALE MFG. CO., Minneapolis, Minnesota.

Sales Representative wanted in each metropolitan center to contact building trade on sensational, low cost "Ace" automatic oil or gas heating plant for small homes. (See illustration Peerless Foundry advertisement, page 76 this magazine.) Exclusive territory and liberal commission arrangement. Unusual profit opportunity. Act fast! Ace Air Conditioning Company, 1853 Ludlow Avenue, Indianapolis, Indiana.

HEATING SALESMEN WANTED — We have openings for five thoroughly experienced heating salesmen. Do not apply unless your experience covers calculating heat losses, laying out forced air heating systems, servicing coal, oil and gas fired units. Address The Rudy Furnace Company, Dowagiac, Mich.

MISCELLANEOUS

OIL BURNING AIR CONDITIONER. Patented for residences, small buildings. Beautifully designed, well engineered and economical. Wish contact with principals who are interested and able to finance and market such a product. Will consider royalty or other suitable arrangements. Address Key No. 430, American Artisan, 6 No. Michigan Ave., Chicago, Ill.

SHEET METAL MACHINERY BOUGHT AND SOLD. Brakes, Shears, Rolls, Rotary Machines. Complete Stock of New and Used Tools. B. D. BROOKS CO., INC., 118 Broad St., Boston, Mass.

SITUATIONS WANTED

Sales Engineer Wants, Air Conditioning Equipment (especially Blowers) to sell Jobber, Dealer on commission. Experienced, Reliable, Successful, West Central States. Address Key No. 429, American Artisan, 6 No. Michigan Ave., Chicago, Ill.

Competent Sheet Metal Worker 40, 26 years experience inside and out. Able to do any kind of work. Also some welding. Good layout man. Have handled men. Address: L. W. Hoffman, 2440 Eastbrook Drive, Toledo, Ohio.

Estimator and Solicitor and a practical Sheet Metal Worker. Desires a position in a Sheet Metal Shop. Will invest capital. Experienced in Air Conditioning. Address Key No. 431, American Artisan, 6 No. Michigan Ave., Chicago, Ill.

Sheet Metal and furnace man, 10 years experience. 35 years old. Prefer Eastern Illinois or Western Indiana. State wages and hours. Address: Sidney McDonald, Attica, Indiana.

Use AMERICAN ARTISAN Classified Advertising for quick results. It puts you in direct touch with the buyers and sellers in the warm air heating, sheet metal contracting and air conditioning industry.

AMERICAN ARTISAN Service Section

SHEET METAL MACHINES

● *Announcing*

4 NEW

MAPLEWOOD MACHINES

1. Model "E" 2 in 1 Rolling Machine. Forms Pittsburgh Lock and Drive Cleat (in 1 operation).
2. Model "D" 10 in 1 Combination
   A Machine for
   Slitting, Wiring, Turning, Burring, Cutting & Edging (1 operation), Making Elbows (2 operations), Single Beading, O. G. Beading, Crimping, Edge Straightening
3. Ingels Gap Gang Punch
   10 holes with 1 stroke
4. High Speed—Specially Built Pipe & Lock—Rolling Machines for volume Production.

For full particulars and prices
WRITE ON YOUR LETTERHEAD

MAPLEWOOD MACHINERY COMPANY, INC.
2634 Fullerton Ave., Chicago, Ill.

CUT YOUR COSTS by Spot Welding

WITH **ACE** SPOT WELDERS

Cheaper, better and faster than riveting.

Built for production service. Engineered to meet practical requirements of sheet metal shops. Made in sizes from 5 K. W. up.

Only **$90**

for Series 62.
Welds 2 pcs. 16 Ga. Steel.
Send for free literature.

PIER EQUIPMENT MFG. CO.
Welding Equipment Division
720 Cross St., Benton Harbor, Michigan

WANTED

ONE HUNDRED Warm Air Heating and Air Conditioning Dealers to establish permanent retail and installation business in Natural Gas territories. Proven positive need for men knowing the business to direct the selling, supervise installations, provide trained mechanical help for installations, and service. You can make money by writing immediately to Key 432, American Artisan, 6 No. Michigan Ave., Chicago, Illinois.

ATTENTION! Shop Owners or Their Sons

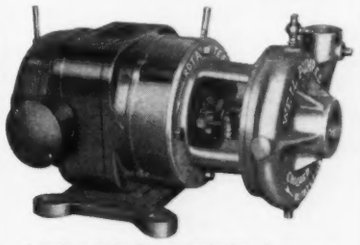
1. Shops eager to give a larger Engineering Service to their clients can secure that Training from our INSTITUTE by Home Study. Numerous Shop Owners have enrolled their sons or other promising person of the Shop. Some fathers who enrolled 20 years ago, now enroll their sons.
2. Shop Owners desiring connection with Skilled Sheet Metal Men with our Technical Training, should write us their desires. We have a number of good men desiring changes. All consultations strictly confidential.
3. Information is free. Merely write us what field you are interested in, S-M Pattern Drafting, Forced W. A. Heating, Air Conditioning, or Contracting and Estimating. Write Now, while the urge is upon you.

ST. LOUIS TECHNICAL INSTITUTE
O. W. Kothe, Director
4541 Clayton Ave. St. Louis, Mo.

"DO-ALL" Combination Electric Hammer & Drill

drills both concrete and metal. Cap. 1½" in concrete—¾" in metal. Saves time and money in setting expansion bolts, anchors and plugs. Soon pays for itself. Easy to maintain. Bulletin 371. Wedack Electric Tool Corporation, 4644 W. Huron St., Chicago, Ill.

AIR WASHER PUMP



Ask For Bulletin R-5500 Electropump
WEIL PUMP COMPANY
Wells and Superior Sts. CHICAGO, ILL.

Manufacturers Agents

MANUFACTURERS WANTING ADditional representation often come to us for names of prospective agents now handling other lines in this field on a commission basis in a definite territory. It will pay you to be on record with us so we can refer your name to interested manufacturers. No charge or obligation, of course. It is a service we render free to manufacturers and representative. Just drop a line that you are interested in being on file and we will send you form to fill out. Address American Artisan, 6 N. Michigan Ave., Chicago, Ill.

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Index to Advertisers

Firms represented in this issue are identified by the folio of the page on which their advertising appears. Advertising which appears in other issues is marked with an asterisk.

May, 1938

Acme Electric Welder Co.....101
Advance Appliance Co..... 73
Aerofin Corp. 77
Air Conditioning Products Co. *
Air Controls, Inc. 89
Aldrich Co. 89
Allen Corp. 93
American Air Filter Co., Inc... *
American Brass Co. 19
American Rolling Mill Co., The 22
American Warming & Ventilating Co. 97
Anthracite Industries, Inc..... 3
Atcheson Glass Co., T. J.....105
Auer Register Co..... 82
Automatic Humidifier Co. 91
Automatic Products Co. ..... *

Baker Ice Machine Co., Inc.... 83
Barber-Colman Co. ..... *
Barber Gas Burner Co., The.. 87
Bead Chain Mfg. Co..... 91
Berger Bros. Co..... 91
Beverly Throatless Shear Co..104
Binkley Mfg. Co..... 93
Brauer Supply Co., A. G.....100
Bremil Mfg. Co..... 98
Breuer Electric Mfg. Co.....102
Buffalo Forge Co.....
.....Inside Back Cover
Burt Mfg. Co..... *

Central Bureau for Heating & Air Conditioning 105
Century Electric Co. 17
Century Engineering Corp. ..103
Chalmers Oil Burner Co..... *
Clarage Fan Co..... 90
Climatemaker Corp. of Tennessee ..... *
Combustioneer Div., Steel Products Engrg. Co..... 80
Conco-Sampsel Stoker Corp.... 23
Condensation Engineering Corp.104
Congress Tool & Die Co.....101
Cook Electric Co..... 86
Crescent Tool Co..... 14
Curtis Refrigerating Machine Co. 87

Dail Steel Products Co..... 93
Detroit Lubricator Co..... *
DeWitt Hotels 102
Diamond Mfg. Co.....103
Dreis & Krump Mfg. Co.....101

Eckenroth Register Co..... *
Eisler Engineering Co.....104
Electric Vacuum Cleaner Co., Inc. 91
Elgo Shutter & Mfg. Co.....101

Fitzgibbons Boiler Co., Inc.... 16
Fox Furnace Co., The..... *
Furblo Co. 96

G & O Mfg. Co., The..... 96
General Electric Co..... 15
Gleason-Avery, Inc. ..... *
Grand Rapids Furnace Cleaner Co. 101
Gray, G. L.....101

Halectric Laboratory 104
Harrington & King Perforating Co. 92
Hart & Cooley Mfg. Co...6 and 95
Henry Furnace & Foundry Co., The 81
Hess-Snyder Co. ..... *
Hess Warming & Ventilating Co. 97
"Home Comfort" Furnace & Mfg. Co. 90
Homer Furnace & Foundry Corp. 103
Hotel Lenox 103
Hussey & Co., C. G..... 66

Illinois Testing Lab., Inc.....100
Independent Register Co., The. 24
International Nickel Co., Inc.. 5
Interstate Machinery Co.....104

Jaden Mfg. Co., F..... 74
Johnson Co., S. T..... *
Johnson Gas Appliance Co....103

Kent Co., The.....103
Kol-Master Corp. 99

Lamneck Products, Inc.....
.....Inside Front Cover
Langsenkamp Co., F. H.....104
Lau Blower Co..... 83
Libert Machine Co..... *
Lincoln Electric Co..... *
Lyon-Conklin & Co.....100

Maid-O-Mist, Inc. ..... *
Majestic Co., The..... 11
Malleable Iron Fitting Co..... 84
Maplewood Machinery Co.....105
Marley Co., The..... 99
Marshalltown Mfg. Co.....102
Maurey Mfg. Co..... 88
Mercoid Corp. 92
Meyer & Bro. Co., F..... 26
Meyer Furnace Co..... *
Michigan Tank & Furnace Co. *
Milcor Steel Co.....
.....Outside Back Cover
Minneapolis-Honeywell Regulator Co. 65
Monmouth Products Co..... 93
Morency-Van Buren Div., Scovill Mfg. Co..... *

National Super Service Co., The 79
Niagara Machine & Tool Works 85
Nichols Co., David.....104

Osborn Co., J. M. & L. A..... 10
Owens-Illinois Glass Co..... 9

Pacific Gas Radiator Co..... 94
Par Appliances, Inc..... 98
Peck, Stow & Wilcox Co..... 81
Peerless Electric Co..... 99
Peerless Foundry Co..... 76
Penn Electric Switch Co..... 75
Perfection Stove Co..... 13
Premier Division, Electric Vacuum Cleaner Co., Inc..... 91
Pyrolite Products Co.....100

Randall Graphite Products Corp. 94
Refrigeration and Air Conditioning Institute 27
Register & Grille Mfg. Co..... 98
Republic Steel Corp..... 28
Rock Island Register Co..... 95
Ruby Chemical Co..... *
Rybolt Heater Co..... 20
Ryerson & Son, Inc., Joseph T. 7

St. Louis Tech. Institute.....105
Sall Mountain Co..... 95
Scovill Mfg. Co..... *
Skilsaw, Inc. 97
Skuttle Humidifier Co., J. L... 85
Superior Sheet Steel Co..... *
Swartwout Co., The..... 78

Trane Co., The..... 18
Tuttle & Bailey, Inc..... 79
Twentieth Century Heating & Ventilating Co. 101

U. S. Air Conditioning Corp.... 25
U. S. Register Co. 12
U. S. Steel Corp. 21
Universal Cooler Corp..... *

Viking Shear Co.....103
Voorhees, G. A.....104

Ward Machinery Co..... 77
Waterloo Register Co..... *
Weil Pump Co.....105
White Mfg. Co..... 99
Whitney Mfg. Co., W. A..... 95
Whitney Metal Tool Co..... 97
Williamson Heater Co..... 8
Wise Furnace Co..... 72
Wiss & Sons Co., J.....101
Wodack Elec. Tool Corp.....105

XXth Century Heating & Ventilating Co. 101

Young Regulator Co..... 88
Youngstown Sheet & Tube Co. 48

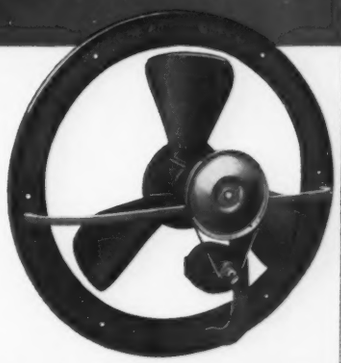
Because...PEOPLE DON'T LIKE HOT, STUFFY HOUSES in Warm Summer Weather

YOU CAN SELL THEM BREEZ-AIR ATTIC FANS for HOME COMFORT COOLING

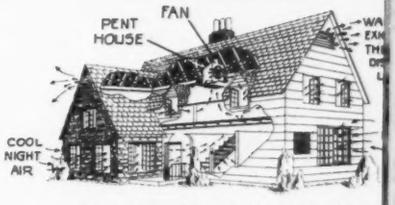
That's why distributors and dealers who are looking for ways to boost summer sales and profits are quickly taking up the Buffalo Breez-Air Attic Fan franchise.

Fans are large capacity—quiet and economical in operation—easy to install. One installation in a neighborhood sells many more.

If you want more sales and profits this summer, write for complete information now. Our merchandising plan will make your sales work doubly effective.



Home Comfort Cooling at a Glance!



USUAL METHOD OF INSTALLING BREEZ-AIR FAN ON ATTIC FLOOR

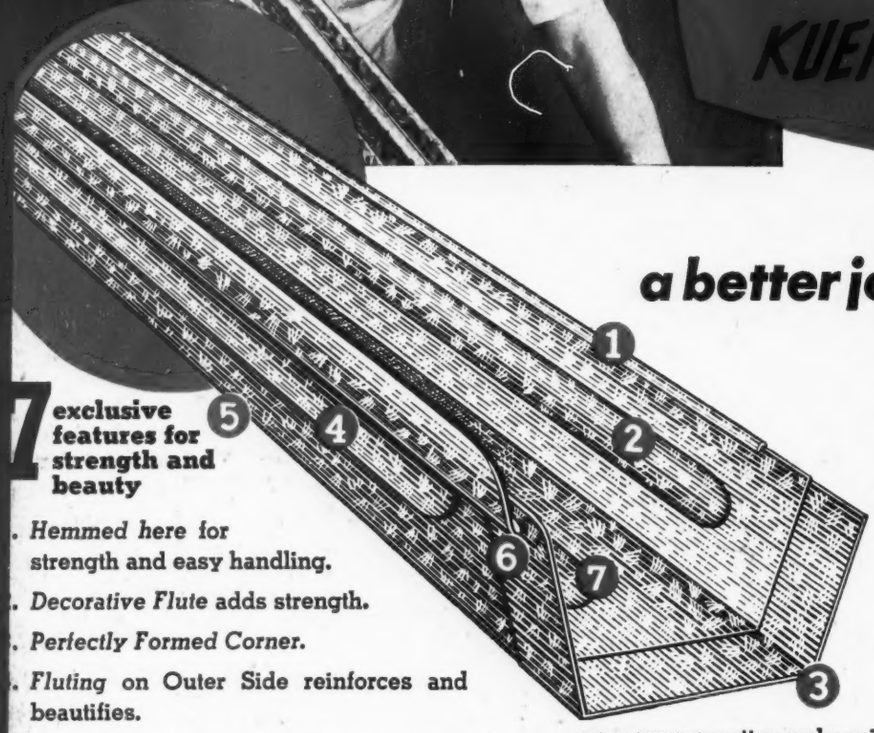
BUFFALO FORGE COMPANY

497 BROADWAY, BUFFALO, N. Y.

Branch Engineering Offices in Principal Cities

IN CANADA: CANADIAN BLOWER & FORGE CO., LTD., KITCHENER, ONT.

You can make a name for your shop—and get the good jobs coming your way — by specializing on KUEHN'S SQUARE GUTTER



it gives the customer *a better job—for no more money*

Kuehn's Gutter by Milcor is the tool you need to build a reputation that brings the jobs you want — the *profitable* jobs—to your shop. With Kuehn's Gutter you give every home-builder what he wants — a *better job* and a better-*looking* job. And this beautiful *square* gutter *costs no more than ordinary half-round.*

Here is the first big step forward in 40 years' use of hanging eaves troughs. Kuehn's Gutter gives you something to sell besides price. Its seven exclusive construction features put it miles ahead of ordinary half-round in every respect. The beautiful appearance the neat, sturdy-looking lines of this new square gutter make a job you are proud of, a job that makes your customer glad to recommend you to others . . . Hanging Kuehn's Gutter is quick and easy, because precision manufacture makes every length straight and true. Fitting joints and accessories is done in a jiffy, for Kuehn's Gutter is easy to handle.

Get above competition and "cash in" on Kuehn's Gutter for new business and new profits. Write today for colorful descriptive literature and free sample.

7 exclusive features for strength and beauty

1. *Hemmed here* for strength and easy handling.
2. *Decorative Flute* adds strength.
3. *Perfectly Formed Corner.*
4. *Fluting* on Outer Side reinforces and beautifies.
5. *Precision Manufacture* makes trough straight and true.
6. *Outer Bead* has stiffening tongue.
7. *Decorative and Reinforcing Flute* on bottom.

KUEHN'S GUTTER

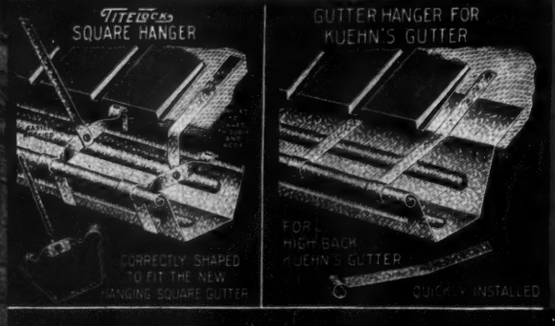
nit of the complete Milcor Line of Rain-Carrying Equipment]

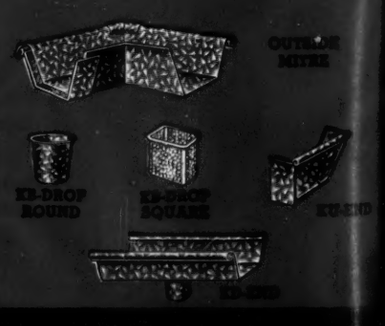
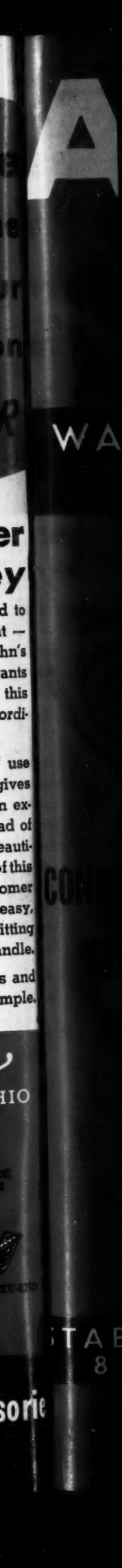
Gives you a job you can be proud of.

MILCOR STEEL COMPANY

MILWAUKEE, WISCONSIN — CANTON, OHIO

Chicago, Ill. Kansas City, Mo. La Crosse, Wis.


TITELOCK
SQUARE HANGER
CORRECTLY SHAPED TO FIT THE NEW HANGING SQUARE GUTTER
GUTTER HANGER FOR KUEHN'S GUTTER
FOR HIGH BACK KUEHN'S GUTTER
QUICKLY INSTALLED



Complete line of KUEHN'S GUTTER Accessorie